Classification Management

JOURNAL OF THE NATIONAL
CLASSIFICATION MANAGEMENT SOCIETY

VOLUME II - 1966

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Here is the complete record of our second annual seminar.

For those who could not attend the seminar — and many were prevented by the airline strike — reading this issue of the *Journal* from cover to cover will be the next best thing to having been there in person. Those of us who were there in person will find that seeing it all in print is a powerful and pleasant reinforcement of a key experience in our professional careers. It is, of course, important to our Society for historical reasons to compile the record of our seminar. And it would be a pity indeed not to preserve the wise and perceptive thoughts, both in the formal speeches and in the informal give and take of the discussion periods, of the distinguished people who were our guest speakers and panel participants.

One additional thought that I find very striking: This issue of the *Journal,* together with the issue containing the 1965 seminar proceedings, comprises virtually the entire body of published information on the professional aspects of classification management.

So by all means preserve your copies of the *Journal.* They are valuable now and will continue to be in the years to come.

The national officers of the Society earnestly recommend the formation of new local chapters wherever there are enough potential members. This seems essential to our growth and continued strength. The first annual reports of the existing chapters, which you will find in this issue, are useful sources for ideas on how to organize and operate new chapters.

While pondering the record and results of our last seminar, we should all be anticipating our next one, which has been set for July 19-21 in Washington, D.C. Plan to attend. If you have any thoughts or recommendations as to the program, please send them along to Gene Suto or to me.

RICHARD L. DURHAM

PROCEEDINGS OF SECOND ANNUAL SEMINAR
Los Angeles, California
July 13-15, 1966

CALL TO ORDER

RICHARD J. BOBERG: Good morning, ladies and gentlemen. I am Dick Boberg, your seminar chairman. It is a great pleasure for me to welcome you here in the name of the Southern California Chapter of the National Classification Management Society. It gives me, personally, a feeling of great optimism to see so many of you here this morning in light of the problems we have had with the airlines. It occurred to me last night it might be a nice idea to award some sort of a prize for the one who had to take the most circuitous route to get to Los Angeles.

The first National Classification Management Seminar was held beginning one year ago today, back in Washington, D.C. I recognize a great many faces that were there. I am sure that all of you gathered a great deal of useful information last year. I know that I did. We are thankful to have you back this year. We promise you an extremely interesting and provocative program.

Our first speaker this morning is not a member of the National Classification Management Society. He is one of our guests. We are most honored to have him with us today. I am speaking of Mr. George D. Thomson. Mr. Thomson is currenly First Vice President of the American Society of Industrial Security and a member of the National Executive Committee of the ASIS Board of Directors. He has held virtually every office available in that society -- Second Vice President, National Secretary, Chairman of the Steering Committee, Western Regional Vice President, Chairman of the Greater Los Angeles Chapter, Charter Member. He is currently Director of Industrial Security at the Los Angeles Division of North American Aviation, here in Los Angeles. He has a B.A. and an L.L.B. from the University of Michigan. He is a former agent of the F.B.I., formerly Managing Director of the Burbank Citizens Crime Prevention Committee in Burbank, California, and from 1955 to this date he has been Division Director of Industrial Security for N.A.A. His professional affiliations are many. He is a member of the California Bar, the California Peace Officers Association, Chief Special Agents Association in Los Angeles, the Michigan Bar, the Peace Officers Association of Los Angeles County, the Society of Former Special Agents of the F.B.I., and a member admitted to practice in the United States Supreme Court. Ladies and gentlemen, it gives me great pleasure and I hope you will join me in welcoming to our Second National Classification Management Society Seminar, Mr. George Thomson.

ADDRESS—GREETINGS FROM ASIS
by George D. Thomson

I bring you warm greetings from the American Society for Industrial Security, and welcome this opportunity

to speak to you briefly on behalf of our society and the common ground of interest that exists between ASIS and NCMS.

We concluded long ago that professional status is not inherited and cannot be bestowed. It must be earned. It was interesting, to me, therefore, to note that many of the important objectives we consider essential to furthering the industrial security profession, have attracted the attention and effort of NCMS.

Let's take a look at some of our common bonds. ASIS publishes the Industrial Security magazine bimonthly. We consider the publication of a professional journal, with fully researched and carefully prepared articles by knowledgeable people, to be essential to a professional organization. Your society journal, the first issue of which was published in the Spring of 1965, establishes your journal as one important avenue of communication with classification management personnel.

Our society has from its inception considered regular chapter meetings, with qualified speakers providing information of a professional nature on a timely subject, to be a keystone for growth. The chapters of NCMS in Northern California, Southern California and Washington, D.C., have adopted similar objectives.

Perhaps most important of all, ASIS each year sponsors an annual national seminar for the purpose of exchanging ideas concerning industrial security and providing a platform for people in industry and government thoroughly knowledgeable in industrial security to present new ideas, the results of individual research, and unique industrial security activities in industry. Our first annual seminar, like yours, was held in Washington, D. C.; ours in 1955, yours in 1965. Certainly a national seminar, of the type that you are beginning here today, is an extremely important part of your overall program. This seminar provides an opportunity for key people in classification management, both in government and industry, from all parts of the country, to meet and become acquainted, and to discuss special areas of mutual interest.

The theme of your seminar, Classification Management in Science and Technology Today, and the program that you will present here, certainly should open new channels of communication between the scientific and technical community and people responsible for certain classification decisions.

It has been the experience of ASIS that the publication of the proceedings of annual seminars, as well as the proceedings of regional seminars, is an excellent and important function in order to bring to the attention of the entire membership pertinent information developed, papers presented, challenging ideas proposed and the solution of problems discussed.

Our society regards classification management as an extremely important aspect of the government's protection of classified information, and currently has an active Classification Management Committee.

NCMS bylaws identify your interests in "Practices and Methods for Identifying Company Private or Proprietary Information." Our society has

established a Committee for Safeguarding Proprietary Information. This is an area of considerable concern on a continuing basis to almost every company in the United States in our highly competitive business environment.

Your bylaws establish your interests in "methods for the indoctrination and training of personnel in the application of classification procedures, policies and requirements." The ASIS National Security Education Committee is currently devoting its energies to security education. It recently has expanded its charter to provide for security education concerning the protection of proprietary information, as well as classified information.

I specifically mention these society national committees because ASIS will welcome opportunity to interchange ideas with members of your society in these important areas of mutual concern.

It was interesting to me to note in reviewing the April 1966 membership directory of NCMS that 36 of your approximately 135 members are also members of ASIS. Your membership includes one member of our society's National Board of Directors and three NCMS members who are present or past chairmen of ASIS national committees. In addition, your membership includes several members of ASIS national committees and one current regional society vice president. Perhaps more by chance than by design, NCMS and ASIS have a commonality, not only of professionalism but in membership as well. Of over 40 industrial corporations represented among your membership, 35 also have members in our society. Thus, in a number of ways, professionalism, membership, and industrial corporations and government agencies as well, ASIS and NCMS have common bonds and mutual interest.

Your society, like ours, is greatly interested in prompt and effective implementation of the new Industrial Security Manual for the Safeguarding of Classified Information (DD-441 Attachment). The new manual being issued this month contains a number of significant changes of great interest to those engaged in classification management and of particular interest are the new requirements being established concerning paragraph marking. Effective paragraph marking will require more detailed guidance than is now provided in the Security Requirements Check List (DD-254) currently being issued by government agencies. We believe that it is essential that the DD-254 be revised to identify more specifically that information which must be protected and the precise reason why protection is necessary. I am certain that people in government responsible for development of this guidance are fully aware of this problem. We hope that your organization, like ours, through appropriate committees or otherwise, will be able to work with concerned government representatives in establishing better classification guidance.

Your interest in classification management in the computer environment reminds me that in the Los Angeles Division of North American Aviation, we have recently automated our central document control of accountable classified information, after reducing

the number of classified documents from approximately 100,000 to about 17,000 documents. This automation has established new controls so we can accurately and immediately identify accountable documents that may be automatically downgraded or declassified and has materially assisted us in having immediately available lists of accountable documents that we desire to retain upon completion of contract. There are a large number of uses for computer technology in classification management. At North American Aviation we are currently using automated data processing to provide users with lists of documents charged to them and are currently studying the feasibility of controlling the automatic time-phased downgrading of confidential material by automated means.

The ASIS Board of Directors, meeting at Philadelphia last week, asked that I bring to this seminar and your membership their warm greetings. Our society appreciates this opportunity to participate in your program.

ANNUAL BUSINESS MEETING

BOBERG: The next order of business is the annual business meeting for the society. Unfortunately, our outgoing Chairman of the Board, Bob Rushing, was unable to be here this morning. I would like to introduce now our former President and new Chairman of the Board, Mr. Donald Woodbridge. I think Don, as we know him, needs no introduction to many, most, or perhaps all of you. Don, to give a little bit of background for those who do not know him, is a graduate of Amherst College. At Columbia University he did his graduate work in physics. He taught at the College of Charleston in South Carolina. He taught physics at Brooklyn College in Brooklyn, New York. He was a research physicist with the SAM labs in New York from 1943 to 1946, and since 1946 he has been with Union Carbide Nuclear Company at Oak Ridge, Tennessee, first as a research and development engineer, then as Head of the Mechanical Development Department. And currently at the Y-12 plant in Oak Ridge, he is Development Engineer, Assistant Superintendent of Special Projects Department, Plant Classification Officer, and Responsible Reviewer. Don is a member of various professional societies: the American Physical Society, the American Association of Physics Teachers, Phi Beta Kappa, and Sigma Phi. Ladies and gentlemen, members, and our honored guests, our new Chairman of the Board, Mr. Don Woodbridge.

WOODBRIDGE: Members of NCMS and guests: I bring you this report and greetings from the Board of Directors with a great deal of pride – pride in what our members have accomplished, pride in our growth. And I am proud too, personally, to be associated with the remarkable men that this society has brought together. It is a little hard as I look around this throng to realize how short a time ago it all started. What began hardly three years ago as the germ of an idea in a small meeting of AEC contractor personnel at the Bendix plant in Kansas City grew rapidly until last year we had 88 members and today we have 137 — not all paid up unfortunately.

I would like to pause here a moment and acknowledge our debt of gratitude to ASIS. I think that those of you who read our bylaws and have watched our proceedings recognize how much we owe procedurally and inspirationally to that most effective organization.

Our current assets add up to $2,261 of which $1,761 is cash in the bank and $500 is an advance to the Seminar Committee for expenses. That is an advance that will be returned to the treasury after the seminar — maybe with a little additional, judging from the excellent attendance here today. The latest report I had from the Committee was that our registration was about 150.

Outside the classification field there is a tendency for people to use words other than "remarkable" in describing classification people. But I still find it a suitable adjective, especially when I introduce, or reintroduce, your Board of Directors.

From the program you saw that Bob Rushing was supposed to be here and Dick has told you that he couldn't be. This is a great disappointment to all of us because he has, as you know, been one of the spark plugs in animating our activities. You will remember that he was one of the early organizers of NCMS. I recall very vividly the day in the Autumn of 1963 when he came over from Lockheed in Sunnyvale and joined the meeting we were holding in Sandia Laboratory at Livermore, and what an encouraging account he brought of the strong interests the DoD contractors had in this embryonic society—an interest, I need scarcely point out, that continues to exercise an important influence on the character and actions of NCMS.

Our new President, elected last night, is Dick Durham. I will ask, as I introduce the Board that the members stand up. Dick is another prime mover in activating NCMS, perhaps *the* prime mover. He has also been on the move in another fashion. A year ago, when he did such an outstanding job of organizing our first national seminar, Dick was working for the Arms Control and Disarmament Agency, where he somehow managed to keep up with the task of advising that agency on the intricacies of classification. Not long ago we saw him busily practicing our profession as civilian assistant to the Assistant Secretary of Defense for Atomic Energy.

Lorry McConnell, our program chairman, who has somehow managed to keep the System Development Corporation satisfied and secure while he conjured up all the speakers you are going to have these three days, is our new Vice President, succeeding Frank May, who was elected Secretary-Treasurer.

Frank will have to work hard to maintain the pace established by Lorry. Frank is — here is another mouthful — Chief of the Classification Management Branch in the Directorate of Security and Law Enforcement, Headquarters, U. S. Air Force.

Newly elected to the Board is Don Garrett, Deputy Director for Classification Management in the Office of the Assistant Secretary of Defense for Administration. Don also chairs the

Committee for Promoting New Chapters, so many of you should be hearing from him regularly.

That brings us to Les Redman, who heads the Technical Information Office at Los Alamos. We missed him last year at Washington but Lorry snared him for the seminar this year and this afternoon you will have a chance to see him in action.

Last year I made my opening remarks to the seminar in considerable trepidation, uncertain where we were heading. But it soon became apparent that in NCMS we had created a viable organization. It was exhilarating to see how vigorously everybody entered into discussion, how we assaulted problems and expanded horizons, while seeing one another for the first time in this new and exciting mode as members of a society freely joined. And so I stand before you today still feeling that triumph as I look forward to the program that Dick and his committee have organized. It is an exciting program. First we expose ourselves to the scientists and face the question, "How bad is classification for the progress of science?" Then we give the forces of Government a chance to reply. And tomorrow we look into the future and try to see what the computer world does and can mean to us.

Speaking before the American Philosophical Society not long ago, Dr. Glenn Seaborg of the AEC quoted C. P. Snow, the eminent British writer, scientist, and political figure, as saying, "I would far rather have choices made by wise men who are not scientifically educated than by unwise men who are." A very provocative statement. Lord Snow was talking about the role of scientists in society, but I submit that his remark epitomizes one of the dilemmas we face in our business. Since I should not be anticipating this afternoon's discussions, I leave the thought there to stimulate you.

Let me show my loyalty to the AEC and quote Dr. Seaborg again. This time he is talking to the graduating seniors at San Diego College.

"Looking ahead only fifty years it is predicted that in the United States alone, some 1,300,000 scientists will be publishing, annually, some 3,000,000 articles in about 60,000 journals. Around the world, a total of about 8,000,000 scientists may well be writing over 20,000,000 articles in some 350,000 journals if, indeed, writing is still a major form of recording and communicating knowledge. Is it any wonder that such importance, almost reverence, is attached to the work and development of the computer today? If any one invention is to be credited with guiding the future of man in the decades to come it will probably be the computer. The day is not far off when almost all fields of human endeavor will be in some way influenced or directly controlled by the computer . . . Today the computer already plays a role in such various fields as medicine, law, meteorology, humanistic studies, freight transport, air traffic controls and a cross section of research, industry and business too numerous and too obvious to mention here."

I think we all agree certainly the computer shows up everywhere — even in *Esquire*, which I get to read

when I ride airplanes. This month, as you may have observed, *Esquire* is featuring the revolution in automobile design and merchandising that has overtaken Detroit, and attributes it largely to the use of the computer.

Now should we add classification to Dr. Seaborg's list? I want to hear what our panelists have to say tomorrow. I will add just one personal note. Recently the Y-12 plant at Oak Ridge made arrangements for on-line access to a big computer in Arlington, Virginia. Our end of the business is just a telephone and a glorified typewriter that talks back to the human who feeds it questions. It is a sensitive creature who refuses to play if you are not polite enough to start off with the remark "Hello." It always has a snappy comeback for any stupidity in the questions. Most of the time it says, "Wait." But at the end of a session it gets cute and says, "Goodbye you all." Perhaps that is because we are way down South. They gave me a demonstration on Monday before we came out here and I found myself thinking, as I walked away, that here in this shiny little gadget I had seen both the threat and the promise that the computer offers us.

(At this point annual reports were read by representatives of the three chapters. These reports are reproduced starting on page 146)

BOBERG: Frank Thomas, who is our next speaker, and our keynote speaker, has been involved in various aspects of the nuclear energy field since 1952. Mr. Thomas has worked in the nuclear weapons program in the Advanced Systems Area for Sandia Corporation from 1952 to 1957. He left Sandia to return to school. He received his advanced degree with honors in nuclear engineering at the University of California at Berkeley. From 1957 to 1964 he was Engineering Division Manager for Aerojet General Nucleonics. In 1964 Mr. Thomas left Aerojet for the Department of Defense, where he served as a Staff Assistant in Defense Development Research and Engineering, Office of the Secretary of Defense. In 1965 he was appointed assistant director for DDR&E for Nuclear Programs of the Office of the Secretary of Defense. He is a member of the American Nuclear Society, American Institute of Aeronautics. He is a registered professional engineer here in California. I must confess that his bibliography is one of the most impressive I have seen. I told Frank before the meeting when I met him, that we had a rule that the introductions should certainly not exceed the speech itself. I think that if I were to read all of his honors, his societies and affiliations, it would take as long as his presentation. Ladies and gentlemen, it gives me a great deal of personal pleasure to introduce, and I know that you will join me in welcoming as our keynote speaker, Mr. Frank Thomas.

KEYNOTE ADDRESS CLASSIFICATION AND TECHNOLOGICAL BREAKTHROUGHS

by Frank Thomas

It is indeed a privilege to speak before this group on the important subject of "Classification and Technological Breakthroughs."

I have selected this topic because I consider that the classification of new technology can have a strong effect, a feedback, on the general advancement, and this relationship is not always recognized. As I have reviewed my talk, I discovered that perhaps most of what I will say today will be to tell you some of the difficulties in arriving at a proper classification for new technology. I hope I will be able to provide some new perspective to make the job of classification a little easier and perhaps a little more effective.

Within the Office of the Secretary of Defense there is a great deal of emphasis placed in "quantifying" the information required to make any decision. The first step in any major decision process is usually to quantify, or place numerical values on all parameters in which this is possible, and to reserve for judgment only those items that cannot be so quantified. In trying to apply that rationale to the subject under discussion I discovered very little that can be so quantified. We can examine past experience, and, with reservations, project this experience into the future. But there are few positive statements that one can make with confidence.

Technological progress depends upon the creativity of individuals. And the creative process is a delicate one. Except on a statistical basis it is nearly impossible to predict how or under what conditions new technology will be developed, when it will be developed, or even if it will be developed at all. I will discuss some of these statistical results and projections acquired by the Department of Defense later in my talk. But we know that the creative process does depend heavily upon an individual being able to acquire, examine, question, and evaluate all new and pertinent information, and classification can have a major impact on the accessibility of this information.

Before discussing the development of new technology in any detail, I would like to make a point on the purpose of classification. First, try to consider and to outline the national objectives or national goals in the broadest possible terms. This can be and has been done in a number of different ways — by political groups and politicians, presidential advisory committees, philosophers, and others. But for purposes of illustration let me examine briefly the national goals as outlined in the Preamble to the Constitution. If you will permit a certain editorial license these goals are: 1, Form a more perfect union; 2, establish justice; 3, insure domestic tranquility; 4, provide for the common defense; 5, promote the general welfare; and 6, secure liberty.

If one accepts that the national goal is (in our technical jargon) to optimize or maximize these six individual goals, then it simply cannot be done. Assume for a moment that we could quantify these goals, and remove the largely unknowable factors of complex human behavior. Even then, we could not simultaneously maximize all six goals. We could not maximize any two goals. Even with our simplifying assumption, mathematically we would be able to maximize only one of the parameters or one of the goals for

any given situation or set of input conditions.

As an example it is impossible to simultaneously achieve, say, maximum justice (goal 2) and maximum defense (goal 4). We must either select only one, or we must achieve a balance between them.

The President has recently established a group to examine our selective service laws in order to achieve a better balance between these two goals. The requirements of the Department of Defense cannot be met while providing absolute fairness or justice to all draftees, or potential draftees, or citizens in general. Inequalities are inevitable. The group will try to achieve the proper balance between defense and justice, but it will necessarily be less than optimum for each.

The framers of the Constitution, of course, realized the necessity of arriving at a balance between possibly conflicting national goals. A great deal of the Federalist Papers, written by Madison, Hamilton, and Jay, was devoted to this subject. As an example, from the Federalist Papers, Madison stated: "A wise nation . . . whilst it does not rashly preclude itself from any resource which may become essential to its safety, will exert all its prudence in diminishing both the necessity and the danger of resorting to one which may be inauspicious to its liberties." Thus Madison, in this case, tries to give some guidelines for establishing a balance between defense (goal 4) and liberty (goal 6). A few years earlier, the economist, Adam Smith, observed that, "defense is of much more importance than opulence."

The point I would wish to make from this rather long digression is this: in the broadest sense, any policy instituted by the government, including the classification policy, cannot consider only a single national goal. Unless we are willing to forego all goals except one, the policy must consider the other goals and make at least some attempt to resolve conflict between competing goals.

The rest of my talk will deal primarily with the cause and effect of technological development, methods to enhance defense, and comments on achieving a balance between defense (goal 4) and general welfare (goal 5).

Under present world conditions, the Department of Defense must see to it that the United States is in the forefront of science and technology, to protect the security of the United States against technological surprise, and to avoid obsolescence. Our defense must not be outflanked by a new scientific advance that is not part of our own arsenal.

In assuring that we are in the forefront, it is necessary to consider the interdependence of current technology — the fact that any modern technology, particularly those associated with complex weapon, space or nuclear systems, benefits from, and indeed requires, technological input from diverse sources.

Early in 1964 a task group within DDR&E started to attack the problem of trying to assess the importance and the value of research and technology to defense, and to see if there was a

favored way to produce high payoff, a favored way to achieve the proper environment. In order to avoid the natural bias of an inventor toward his most recent invention, the group decided to focus on an examination of past accomplishments rather than the prediction of future ones. It takes five to ten years for discoveries or inventions to be applied to the defense inventory and thus provide an unbiased assessment of their utility. The group wanted to be certain that the accomplishments that they had focused on had a clearly identifiable use. The study objective was to discover circumstances which the Department of Defense could manipulate or control, and which favor the initiation, execution, and utilization of research and development programs. That is, find what techniques or methods have been successful in the past, on the average, and which had been unsuccessful, and to make at least statistical predictions concerning future development. For each weapon system the group asked: "What recent scientific knowledge or new technology is important to the increasing of the performance or reducing of the cost?" "Where was the work done?" "What motivated the creators?" and, "How was the research initially financed?"

In nearly all cases, technological advancement occurred only when the following three elements were present: 1, an explicitly understood need, goal, or mission; 2, a source of ideas, typically a pool of information and experience and insight in the minds of the people who could apply it; and 3, resources — usually facilities, materials, money and trained men.

The results of the study to date demonstrate the interdependence of the technologies required for modern weapon systems. Technological breakthroughs, single quantum jumps, as one might suspect, are rare. They are the kind for which Nobel prizes are won. Such breakthroughs might include the discovery of nuclear fission, the transistor, the maser. To go from the very basic breakthroughs, however, to a piece of hardware of significance to national defense and security, is a long process involving hundreds of less spectacular and smaller steps in technology.

The study showed that perhaps 50 to 150 of these smaller steps are needed to make the quantum jump in system capability. A number of these steps are made by organizations and research personnel directly working on a particular project. Some of these are in the nature of "scheduled inventions" — advances originated and motivated by the desire to find a better way to solve a pressing problem for the project. But a significant number of these steps had their origin with the persons remote in space, and perhaps in time, from the groups working on the specific system. A considerable number of these steps originated in research institutions or universities which provided a new idea, a new concept, or a new analytical method which was readily adaptable to the problem at hand.

Throughout the development process, free communication between technical communities and between the individual scientists and engineers

is important. A solution cannot be utilized unless the person who has the problem is made aware of the solution or at least the existence of the solution. A case in point occurred in Germany during World War Two. The German submarines were being ·lly defeated because they were un- · to counter Bri'ish radar. The nan Air Force captured some _ sh radar equipment, but because of over zealous protection of the information, the German submarine command did not learn of this for six months. Undoubtedly, the war was significantly affected by this one instance of short-sightedness and over-restriction.

Another point brought out in the DDR&E study that may bear on the topic under discussion is that of organizational flexibility. Informal personal communications are an important factor in developing new technology. Very often, the first step in approaching a new problem is to get on the telephone with a colleague who is or was working on a related problem. This colleague may be in the next building or across the country. And anything that impedes this informal communication impedes development. Nearly all technological advancement has occurred in flexible organizations in which strict lines of authority do not operate and in which there is relatively uninhibited communication between the technical personnel at all levels. Apparently, in such an organization a new idea can be more easily received and evaluated on its merits, and the inventor is highly motivated to bring forth new and unique ideas which aid in the solution of the problem being addressed by his group. By and large, new technology does not come from strict and authoritarian organizations. New technology cannot be tightly restricted or compartmentalized.

The point to be made is that any classification or other restriction on the free flow of technical information will necessarily impede the development process. This is true both within a group and between groups. The solution to a technical problem may come from a number of sources. In one case examined in the DDR&E study, a mathematical paper written many years earlier suggested a new solution. In other cases it may be from another individual or group working in a technology quite remote. We cannot predict solutions to technical problems. We cannot predict the origin of the solutions. And often we cannot even ask the proper questions or formulate the problem. But we can predict that the highest probability of achieving a technological advance will come under conditions in which people are highly motivated and have free access to all available information, and have free and uninhibited communication within their group and with other groups.

I am not suggesting that the classification barriers that we have found necessary in this country should be lowered. Perhaps barriers should be raised. But it should be clearly recognized by all concerned that barriers of any kind will necessarily impede the development process. Solutions will be missed, inventions re-invented, and less satisfactory means accepted. This is true in the development of

hardware for defense. And it is true in the development of hardware that benefits the economy as a whole.

So with regard to classification, I suggest that two judgments are required. First, how much will the classification or restriction of a particular piece of new technology restrict the development of other defense systems. The balance here is one of impeding your own development as well as that of your potential or actual enemies or competitors. Second, how much will the classification or restriction of a particular piece of new technology restrict the development of the general economy. The balance here bears directly on my earlier remarks about national goals. There will necessarily be a conflict between what's best for defense and what's best for the general welfare, or the general economy. Classification of particular technology may be best for our defense posture (relative to other nations), but may be bad for the general economy.

I believe that within this country we have an automatic safety valve. This lies in the high mobility of the technical community. Even when specific design information is highly restricted, the techniques and methods used to develop that design becomes diffused throughout the technical community in a relatively short time by a reasonably efficient method. The technical people move, change jobs, and adapt the new method to solve their new problem. If a new large group is established in this country to solve some problem or design some sophisticated device, you will generally find that the group will contain individuals who have experience at most of the major laboratories and industrial installations in the country. To some degree, the collective past experience of all these installations can be focused on the new problem. When a technical man quits his job and moves on, we may consider it a loss. But to some extent he is a missionary carrying with him the techniques and knowledge he has acquired. This diffusion process is noticeably lacking in totalitarian societies, and I believe their technology is weaker because of it.

We have one other automatic feedback mechanism. A great deal of research and technology in this country is done by commercial organizations whose primary goal is to achieve a profit for the investors. In general, if a particular new technology will perform a useful function that could not be performed before, or will do it more effectively than it could be done before, then it will aid the nation as a whole. In either case, there is generally an economic incentive to utilize the technology in the general economy, a profit to be made in this utilization. Management of a commercial organization will usually realize this potential and will take some action to see that the new technology or at least portions of the new technology are made available for this purpose. I expect that this mechanism is a far more efficient one than negotiating values between government bureaus as required in many nations.

I have discussed the rate of technical development as being a significant factor in today's national de-

fense. Today a nation cannot depend primarily on a depth of defense in space, but is clearly compelled to develop its depth of defense in time as well. Technology is indeed moving at a rapid rate, and this is a relatively new factor in defense. If you will permit me to go back 600 years I can give you an example that this was not always so.

The English, in the course of their Welsh and Scottish wars, developed a new instrument of warfare, the longbow. It clearly outranged and outmatched the crossbow which was in general use on the Continent at that time. In the course of these wars the English had also developed the tactics which made good use of their new technology. In 1346 King Edward, with an English army of 20,000, met a French army of 40,000 at Crécy in France. The French army was vastly superior in mounted men and armor, and in Continental warfare this was about all that counted. With the longbow, however, the English were able to engage the enemy at a great distance, and the French, under the rain of arrows, were unable to assemble any reasonable charge of their armored knights. The French army was practically annihilated. Sixty-nine years later the English again met the French at Agincourt. Again the English had the longbow and the proper tactics and the French did not. Again, the French knights were virtually annihilated. In 69 years the French had neither copied nor countered the new English weapon. It required another 200 years for the final defeat of the armored knight, in the person of Don Quixote, under the pen of Cervantes.

I came upon another example a few months ago while touring El Morro Castle in San Juan, Puerto Rico. King Charles of Spain authorized the construction of the castle in 1523. Some 20 years were spent in raising funds to build the castle, another 10 or 15 years designing it, so that the first fortification was not completed until 50 years after it had been authorized. I have heard comments about the long time sometimes required today to get military construction authorization and appropriation, but I think no one can argue that the pace of technology has not increased at least a little since El Morro Castle was built.

The third example I might mention was told by Winston Churchill. Prior to World War Two the British were acquiring new battleships and Churchill authorized construction of new ships based on a new large gun which had not yet been tested. The new gun, as I remember, was a rather modest extrapolation over the existing ones. It was apparently a startling innovation, to be committed to a course of action based on a technology that had not been demonstrated. I believe this is fairly common today.

Again, the pace has quickened and technology continues to move at an ever increasing rate. If we postulate that the rate of technological advance is directly related to the technical information and qualified people available, then the absolute rate of advance of technology will continue to increase in the future. Is this postulation correct? Note that the segments

of our economy that are increasing most rapidly are those in which the most technological advance is occurring — electronics, communications, and chemicals. The segments declining are those in which there is almost no technological advancement — wooden containers.

Time scales will be further shortened. This time factor in itself introduces a new facet in defense planning. It suggests that a nation might assure its security simply by advancing more rapidly than all potential enemies. It is a facet that renders opposing forces obsolete by the time they are deployed. The opposition is outflanked in time, rather than in space. This is clearly not the case in all fields today, but it is a strong factor in many fields. This time factor is more important during an all-out war than it is at a time like the present. During an all-out war the cycle time between offense and defense is shortened. There is rather complete knowledge of the weapons being used by the opposition and a strong incentive to develop techniques to counter these new weapons.

In reviewing the classification problem under wartime conditions, I would like to quote a paragraph from the report of the Office of Scientific Research and Development, written in 1946 by the scientists and engineers who were engaged in this race during World War Two. The report states that:

"In the midst of war, it is clear that the best security lies in speed, in achievement, rather than in secrecy. That this secrecy can defeat its own purpose is shown by the frequency with which enemy scientists independently discovered techniques zealously guarded by us. Our secrecy merely slowed down our own production and decreased our time advantage."

I should point out that the fact of independent discovery also operates in peacetime. The history of technology is full of examples of nearly simultaneous discovery by two independent parties. This process is doubtless still continuing in certain areas.

Again referring to wartime conditions, the OSRD report states that:

"Science, in its military applications as well as in its basic form, must be a 'free science' in order to be strong . . . contributing parties must be adequately informed about the tactical and technical problems. In spite of this obvious fact, there was far too much indiscriminate, blind classification of military information, scientific discoveries, technical equipment, and correspondence.

"Not only were our civilian scientists given too little access to military planning, but they were also kept in mutual ignorance of scientific advances in cognate fields. Discoveries made in radar should have received much wider dissemination to those working in communications, television, underwater sound, and other fields. That these discoveries were not so distributed is a sad reflection on the scientists themselves who were temporarily forgetful of the very essence of creative thinking — freedom of publication. No one is suggesting unrestricted publication in the public journals, but surely there could have been a series of classified journals,

available to all cleared scientists, which would have broken down artificial and highly injurious barriers. The writer has personal knowledge of many instances where greater restricted distribution of basic scientific and technological data would have profoundly increased our scientific strength."

Thus, at least in the mind of some World War Two scientists, overrestriction of data did have an adverse result.

A sustained high rate of growth also enhances national security by promoting the productive and economic growth of the country. Thomas Paine once said: "War involves in its progress such a train of unforeseen and unsupposed circumstances that no human wisdom can calculate the end. It has but one thing certain, and that is to increase taxes." However, in the past year the United States has simultaneously made a large increase in our efforts in Southeast Asia, has cut taxes, and has just established a record for revenue in a single year. Perhaps our dramatic rate of growth has contradicted Tom Paine.

National security is indeed related to overall national strength. And continued growth in overall national strength is heavily dependent on continued rapid advances in technology —better transportation, better communication, a technology that permits increased output for every person in the labor force and from every bit of our natural resources expended. This continued technological growth requires a free interchange of technical information between scientists and engineers.

In conclusion then I would like to summarize the points I have made as follows:

1. An effective classification policy must include consideration of the effect that possible restrictions of information will have on other technical developments. Such restrictions will necessarily have some adverse effect on the development of your own systems for national defense and national security.

2. Such restrictions will also necessarily have an adverse effect on the growth of the economy as a whole and national security is not unrelated to this growth.

3. That the requirements for national defense in an absolute sense are not ends unto themselves but must be balanced against other necessarily competing requirements such as justice, liberty, and general welfare.

I hope I have provided you with some added perspective. I have tried not to argue for or against any particular classification actions, but I have tried to point out that future technological growth in defense and in non-defense industries cannot be ignored in arriving at classification decisions.

BOBERG: Thank you very much for those kind remarks. Our Chairman, Don Woodbridge, would like to conduct some additional business with us.

WOODBRIDGE: The additional business is what you may like to propose at this time. Are there any questions?

QUESTION: Will you publish a transcript of this last speech?

WOODBRIDGE: Yes.

JEFF LONGRIDGE, Rand Corporation: I'd like to ask Mr. Thomas a question. Are you familiar with Air Force Regulation 205-29?

THOMAS: Not by that number, no.

LONGRIDGE: Well, this regulation has to do with publication of research. If taken literally, it means that all research things done by a corporation under a government contract would have to be classified. I wonder if anyone else would have any comment about that regulation.

WOODBRIDGE: Would you repeat again the document to which you refer?

LONGRIDGE: Air Force Regulation 205-29. This regulation, taken literally, would mean that almost all research publications done under government contract — Air Force contract, I should say — would have to be classified. But apparently it isn't bothering anybody else in the room.

WOODBRIDGE: Do you recall — not having the document itself — do you recall the wording that leads to that conclusion?

LONGRIDGE: It is broken down into three parts which they try to clarify with another pamphlet, the number of which escapes me. I don't remember the exact wording. It's a four-page regulation. It just makes everything classified. Of course, we don't apply it literally because it just doesn't make sense.

WOODBRIDGE: Frank May, have you any comment?

MAY: Well, the regulation, of course, as you recognize, is an Air Force publication. It is not binding on the contractors unless the individual who has entered into contract feels that the end product will fall within the realm of classification. This was our effort when we published it, to get the scientific and research people aware of the need for classification in research when they thought that this would have a military application. Now what we were attempting to do there, and I thought we had been successful at this, was to prevent highly sensitive work, reports, etc., from getting out into the public domain and then putting us into a position where we would not be able to recover the information. As far as I know, this was the first effort that any department had made to get our basic scientist, so to speak, acquainted with the classification requirement. I don't recollect any specific problems in that area. As a matter of fact, we have a security representative here from the Office of Aerospace Research, and they have gone ahead with this regulation. I haven't got any communications from them and I believe that we are living with it and I don't know of any specific problems. I am sure that it's probably generated more classified requirements than in the past, but I hope it's only because the people who have worked in that field are more knowledgeable of the requirements for classification.

A. A. CORREIA: The regulation he is talking about, 205-29, has a counterpart which is Air Force Pamphlet 205-2-1. I think maybe Mr. Thomas could advise us on this. I don't think this prohibits scientists

from getting the information because it is classified, because we certainly furnish most of the scientists the information anyway.

THOMAS: Maybe I better clarify my talk. I wasn't in any way trying to establish policy or change policy. I was trying to point out, from a technical standpoint, some of the factors that must necessarily be included in arriving at classification policy. I hope I wasn't misinterpreted in having arrived at classification policy, because that was not my intent.

WOODBRIDGE: Have we succeeded in clarifying that matter?

ANSWER FROM AUDIENCE: No, but thank you.

WOODBRIDGE: Do I hear any other questions? One of the continuing needs, of course, for the society, is the institution of new chapters. I was very much impressed as I listened to the reports of the three existing chapters on how effective their work has been, and I get the very strong impression that they have profited much from their getting together. Setting up chapters in other areas is by no means so easy because of the geographical distribution. I wonder if we might call on Don Garrett at this time to say a few words about those problems and what we hope to accomplish in the future.

DONALD GARRETT: One of the things that faces us is an attempt to reach all of the people in the areas other than the areas where we now have chapters organized. I am thinking particularly of the Philadelphia, New England, and Alabama areas, where we do have a fairly large concentration of government and industry people who are faced with problems in classification management. We have attempted, through our chapter in Washington, to reach people in the Philadelphia area, in New York, and in New England. We have some pretty good contacts — people who have expressed some interest. However, we need your help in spearheading a drive in your own particular areas where you do have a concentration of people sufficiently large to develop chapter interest and chapter work. And if any of you from any area, not just those I have mentioned, but in the midwest — Dayton for example — where you might have a large group of people, want to contact somebody, or if you need some literature, you can contact the new Secretary-Treasurer, Frank May, or me or any of the officers of the organization or any members of any other chapters, and we will see if we can't get to you some information that you could use as promotional material. We believe that our society has a potential, a real potential, for helping both government and industry. It is only through the chapter meetings that we can do much of this promotional work. It's probably one of the best means for accomplishing this personal contact that is so necessary in transferring ideas and communicating. So if any of you would like to volunteer, please do because we do need your help in spreading and arousing interest in all areas. We believe we can supply a real service to classification people wherever they may be.

GEORGE MacCLAIN: I wonder if it would be appropriate to touch on a couple of points made by Frank

Thomas, which I think I identified in his talk, to see whether or not any profitable discussion of them could take place here. I don't know how much time is available for this. I have two points that I think might merit discussion and I'll tell you what they are if you would like me to.

WOODBRIDGE: Go right ahead.

MacCLAIN: Well, we have in the DoD Instruction 5210.47 a paragraph that I think is directly related to one of the major points Frank made in his talk: namely, the interrelationship between classification on the one hand and the consequences of it to the general welfare or the national economy on the other. And we put this into the instruction. I think it's one of the principles known a non-military consideration, and it says in effect that in the case where there is evidence of -- let's call it—overwhelming possibility of benefit from certain information, if it could be released from classification, the question of whether it will be released from classification, or whether in the first instance it will not even be classified, has to be decided at the highest levels in the Department of Defense, for example, the Secretary of Defense, or Assistant Secretary, or the Secretary of the Army. The theory is that classification first of all is supposed to protect information the unauthorized disclosure of which would be harmful to the national defense. This, in my opinion, certainly puts national defense as priority number one for classification purposes. We recognize, therefore, that this is a very real problem. And despite this fact, since we have been in business, there has been only one subject matter area in which this question has been raised at all. I don't mind mentioning what it is. It is nothing secret. It has to do with infra-red equipment and certain other equipment. I don't know, Frank, whether or not your remarks, which are entirely consistent with this theory of having to make a determination of classification in the environment of the pros and cons, has been thought through any further by you than what you actually said — whether there is any enlargement upon this that you would like to make in the form of procedures for bringing these questions up or methods for resolving them if they are brought up. If I don't make myself clear, please tell me.

THOMAS: This avenue is open, this avenue for declassification because of its effect on the general economy. It's an avenue that is open and perhaps we should be making more general use of it. Perhaps in some areas technology is being tied up and is not available when it perhaps could benefit the general economy. I point out this one safety valve: I think industry has a large incentive to use some of the techniques that they have learned. The techniques themselves may not be classified although the particular devices are. This is the way in which some of this information is getting out, is benefiting the general economy, and I think it's doing so without any real impairment of our national security at this time.

MacCLAIN: Well it's just the peculiarity that what you said seems to touch on the other point of the two I wanted to mention. This is a very touchy point, in my opinion. How

does a scientist, engineer, or what have you, who has knowledge based on experience gained in a classified environment — how does he prevent use, if he does prevent it, or how does he use, if he does use, this knowledge the next time he goes to work on a new project. For example, I could name another one, and I am not going to, but there is a situation in which equipment has been created and the question arises whether that equipment is based upon classified information gained by someone connected with this new equipment. The evidence is, it is not. The thought is that maybe it is. Is Frank Thomas suggesting that it is not only a good idea but a necessary thing that scientists, as they move throughout the world of science and technology, carry with them and use, in their next stopping point, the information they have used in their previous operations — classification to the contrary? It's so subtle and I wish I could express it better.

WOODBRIDGE: It is very subtle, and of course it has an amusing aspect to it from our own experience. What we might call Y-12 alumni go out into other areas, particularly other branches of the Union Carbide Corporation, and they always remember their friends back at the base and are an everlasting headache for the classification office. Their activities sometimes result in *de facto* declassification which has to be recognized as legitimate declassification, and it certainly makes a real headache and there are great subtleties. It would seem to me that the policy, so far as I have observed it, requires that these alumni, as we may call them, exercise the very, very difficult judicial function of deciding when the knowledge they make use of is based on still-classified information. I only wish that they were all able to do it and continue to do it. I think of another example out of my own experience, recalling back when I was in the SAM laboratories in New York working on the Manhattan Project. I worked in a very active development program for some of the mechanical devices in the diffusion process. And as time went on it was inevitable that these things would be rediscovered. It was also inevitable that with our mechanical ability we would be called upon by industry in a consulting capacity to develop devices along similar lines which the industry might want. And one poor chap who was really in a terrible spot — he was no longer employed by the government — got called down to the classification office and had a long meeting, the upshot of which was that he had to watch and see these things redeveloped and he was not able in his consultive capacity to make use of what he already knew. If he was going to contribute as a consultant, he had to go another route. Whether this is good or bad is open to question. I hope you all recognize that Mr. MacClain is the Director for Classification Management in the Office of the Secretary of Defense for Administration. Would anybody like to pursue this subject further?

MacCLAIN: Don, may I just say that if anybody in the audience wants to pursue it further in relation to any existing situation that comes to his attention, we would welcome his

thoughts, which he may wish to send us at Washington. We haven't any experience here at all, really; we would like to gain some. And I may have raised questions for Frank that he didn't intend to address himself to. All I want to say is that I am delighted that we raised them, that he did address himself to them. They are, in my opinion, tremendously important.

WOODBRIDGE: I think these are questions that we have expected to arise in the seminar in view of the topics presented.

QUESTION: I am George Chelius. I represent the Douglas Aircraft Company. I was wondering, in regard to classification management, how the society feels concerning two basic areas here. First of all AEC contractors and DoD contractors. Now classification generally stems in AEC from a legislative enactment and in DoD from an executive order. How do you reconcile the two in classification management?

WOODBRIDGE: I am speaking as an individual now, not as a representative of any classification agency. In a sense, the difference is more philosophical than practical. There is, of course, under the Atomic Energy Act a notion that is characterized in the phrase — all information within purview of the Atomic Energy Act is "born classified." Some people feel that this is a pernicious phrase and it pushes the doctrine too far. I won't argue that point here. But actually, of course, any time a document or piece of information is released somebody ought to be making a decision whether it is classified or not. So I think from the practical point, if you consider either system in its ideal functioning, we can say that the result ought to be the same. You have a considered opinion on the sensitivity of the information being developed before you release it.

CHELIUS: Well, from an AEC standpoint I can understand this. The AEC generally classifies concepts — perhaps terms, words, and things such as this. From the DoD standpoint, from what I have been able to determine, they classify according to program or usage rather than from concept. And from a DoD contractor's point of view, working of course with materials which have been released from the AEC, it is difficult to determine exactly what the AEC has classified and what they have not classified. From our particular standpoint, and from that of a lot of subcontractors here, it is hard to get the information to really determine what is and what is not classified.

WOODBRIDGE: Do you relate this to intelligibility of the guidance provided or to the absence of the guidance?

CHELIUS: I would say it stems from the absence of guidance.

REMARK (name not given): I would like to address myself to the question. I agree with you that there is a lack of guidance and perhaps my office is a little bit responsible for this. One of the reasons we founded NCMS was to try to bridge the gap between AEC and DoD and to increase the communication exchange and flow of ideas. The difference, of course, stems from the two legislations. The Atomic Energy Act requires that all information be born classified or positive find-

ing be made that it's declassified or can be declassified. We operate by Executive Order 10501, as you well know, which says that you have got to demonstrate that you should classify it. The other part of the problem, until the last three or four years, is that there has not been enough of an interface or exchange of ideas on what should be protected on both sides. I think it is coming. Hopefully, we are expediting it.

MacCLAIN: I think that what I am going to add may be common knowledge but I am going to say it just for the sake of getting it out. The term "Restricted Data" as used in the Atomic Energy Act is an all-encompassing phrase for information defined in the Atomic Energy Act as being of that character. The Executive Order, of course, does not use the phrase "Restricted Data." It does use the terms, "top secret," "secret," and "confidential." And it is just an automatic thing that anything that is Restricted Data has simply got to bear one of the other labels also. And in having one of the other labels added to it the standard used to select the label is the degree of harm to the national defense that would occur from the unauthorized disclosure. Accordingly, nothing is just Restricted Data. It is always Restricted Data at some level of classification. I am not sure whether the questioner had that in mind, but I just wanted to say it.

CHELIUS: I think I am aware of that as far as joint classification goes. The problem is that coming from the AEC to the DoD level, it is hard to get classification guidance. For example, to attempt to get your classification guide for weapons, CG-W-1 — it's totally impossible from a DoD contractor's standpoint. It is impossible. And to expect a contractor or an individual of the company to check Restricted Data such as this goes along with the movement of personnel. People have gone from the AEC to DoD contractors and naturally use this information or use their technical knowledge here. And if we are going to be asked to classify properly then we have to have the guidance.

WOODBRIDGE: Well, that touches on a question that I have often raised. Is compartmentalization of information appropriate in the classification business? My personal opinion is that it is not. The classification man who makes decisions can't know too much if his decisions are to be informed and proper. I know I would receive considerable argument about this from men who feel that it is possible to limit the extent to which the classification office needs to have the information. But I know from my own experiences when I don't get the information I am always in danger of making a wrong decision.

GARRETT: It is important, I think, both in the contractor field and in the DoD field, not to lose sight of the fact that you will make a lot of money if you decide to classify information and concentrate on that one fact. Too often we apply classification to the hardware without reasoning why. I think this might be part of your problem. If you understand exactly what information you're working with requires classification you could then trace that information to various pieces of hardware to find out

in what manner it could be revealed and thus be harmful to the national defense. I think it is important to concentrate on that idea and to understand it. A lot of classification guidance that you receive, particularly at the planning levels, does not explain to you sufficiently, clearly, just exactly what information you are trying to protect. Now if you did have that, you could then translate it, more readily, to relate it to things you are working with. Cut down on the amount of classified material that you have. This is one thing we can concentrate on, one idea that we as classifists could pass around among ourselves — ideas and methods and techniques by which to develop this idea of classifying information, passing on the doctrine. In this way also, I believe that we can further enhance the flow of scientific and technical information by making sure that we don't classify what is commonly called basic research—the study of materials, the properties and what not — until such time, as Frank suggested, that we apply it to a particular military application. At that stage we start to get into national defense and affect national defense to a very marked degree. I think this is one way we can do a lot better job as classification managers concentrating on this idea of identifying information. Some day I hope to write a little paper for our *Journal* that might help to get across this idea. To me it is very important. I hope it is to you too.

MacCLAIN: I think it should be pointed out that the subject that has been discussed now is one of the major topics of the seminar's business. It's in the program, is it not?

WOODBRIDGE: Yes, I believe so.

QUESTION: My name is Stelle, of Atomics International. I notice that we have managed, as a society, to put out one copy, or one issue, of our *Journal*, and the proceedings of the last seminar are still yet to come out. Is there any effort being put to increase this information flow which is really one of the basic purposes of our society?

REDMAN: The problem of getting the proceedings of the preceding seminar out has been one of extracting them from tape, from editors, and right now from the printer. The printer has approximately 35,000 words being set in type. There are perhaps half again as many more to come. This is going to cost something over a thousand dollar to put out, and will encompass the second, third, and fourth quarterly issues of the first volume. The seminar chairmanship for this seminar has taken a far more effective approach to the problem of recording the presentations here by obtaining copies of papers from speakers, and by recording the discussions by a court reporter using stenotype rather than tape, so that a transcript can be prepared fairly promptly. In addition, a problem last year was that the transcribing firm that undertook the task of transcribing the tapes was unfamiliar with the mechanical equipment, even though nothing about it was classified, and extracted only about a quarter of the channels of information recorded. I don't know what you do with something like that, Mac, but the net result is that the *Journal*, to wind up last year, will be

the seminar proceedings and hasn't made it through the press.

WOODBRIDGE: The board agreed last night to appoint, throughout the country, regional reporters who would feed current information into the editorial staff of the *Journal* so that it will take on topical and newstype character. Are there any further questions for discussion?

KEN WILSON, from Sylvania: I find a growing effort on the part of contracting officers to build additional classifications of their own, so to speak. As an example, one we have right now specifically states nothing higher than secret is in it. But it goes on at length, some three pages, as an addendum to the 254, to specify that this material will come in through a special control point. It will go out through a special control point. It will be controlled by a separate control point. It will be turned into this place on a daily basis. It will have special access lists approved by the government on an individual basis and it will be stored in top secret type safes. I am wondering if we can have an education program going for us to say just top secret, rather than three pages describing the top secret system. Now these three pages say, in my opinion, top secret, if you will.

WOODBRIDGE: Aren't you touching on the interface between security and classification? It seems to me your remarks are certainly things we all have to think about here but are more appropriately addressed to the security branch.

WILSON: I can't agree with you. Perhaps if this project officer had a little education in classification he could have found something to do better in the time it took him to write these three pages of the 254. There are other programs, of course, like this one which Dick Boberg mentioned. I wonder whether there is a program going to educate these program people in classification. In effect what they are saying is that what you are going to be handling is only secret as far as words, but as far as what you will do with it, it might as well be top secret.

QUESTION: My name is Dan King and I am with Lockheed Missile and Space Company. We had similar problems developing and I'd like to suggest that Mr. MacClain somehow get across to the contracting officers that they limit this to classification guidance. And if they want to start amending the Industrial Security Manual, as far as control of classified material, that they force the contracting officer to look upon this as a contract change and write it into the contract and be willing to discuss the added costs that go with it. I think this is something that just about every major aerospace company ought to take a good look at.

RICHARD DURHAM: Let me speak to this problem a little bit and interject a question for Sylvania. Do you have an AEC contract or are you doing AEC work under a DoD contract?

WILSON: Just DoD. No AEC implications at all.

DURHAM: Does the contract itself get into special access requirements?

WILSON: They carefully avoid the words in the contract or the 254's. They just delineate, as I say, for some three pages, if you will, special con-

trols, and those are my own words, that we will apply to this information under this contract.

MacCLAIN: I would like to ask a question for clarification from both speakers. Are they saying in effect that physical security should be interrelated to the level of classification selected so that if you select a level of classification from that time on you will not have confusing, maybe contradicting, elements of physical security. Is that the point they are trying to make?

KING: We weren't particularly speaking just to that point. The matter seems to be that there is a growing tendency to avoid the control set forth in the ISM over classified information, and to deliberately avoid the so-called special access terminology and develop something in between, which they refer to as "restricted need to know" controls. But along with these, they start throwing on all sorts of maintenance of access rosters, and even get into areas of stipulating more than normal protection in terms of usage or special type cabinets. Now from my view — and I will readily own to a more security than classification orientation — but from my point of view this looks like a very nice way to add requirements without generating any costs. In fact, I have heard it said that the contracting officer looks upon the use of the 254 as a very nice device to add special security requirements, not classification requirements, but security requirements, for controls and safeguarding and everything else. And I think all of us will tend to agree, at least, that the 254 basically is a device to let the contractor know what the classification requirements are, and if they want to get into control requirements and handling and storage requirements, there is another avenue. That seems to be going down the road of trying to avoid writing in contract changes to the ISM. They are simply using the 254, which can be unilaterally changed by the government, which the contractor has no real recourse against, and it bears a contracting officer's signature. So here we wind up getting stuck with a lot of added security costs that are not consistent with the ISM. For instance, I can think of about a half dozen instances where our organization is bound by a 254 in controlling things under a restricted need to know system. I would appreciate it if somebody would please tell us what the difference is between "need to know" and "restricted need to know." Nobody has ever defined this.

BOBERG: I wonder if we can put this discussion into our afternoon discussion periods. I think we are all delighted to have this type of question asked. However, we are getting near the lunch hour and we do want to have a few moments for you to have before lunch begins.

FRANK MAY: Ladies and gentlemen, welcome to our first luncheon. I wish to call upon Dick Boberg to introduce his committee who have done such a fine job here.

BOBERG: Thank you, Frank. I hadn't anticipated introducing the members of the committee at this point. I think it's a little early to take credit and I am sure these fellows won't want any of the blame. Our

Special Activities Chairman is Robert L. Beckner, Classification Management at TRW Systems. Our Public Relations Chairman from System Development Corporation is Tony Cetone, also in Classification Management. Arrangements Chairman, the good looking fellow who has arranged to sit with all the pretty girls, is Jack Fuchs, who is in Classification at Aerospace Corporation. Our Budget and Finance Chairman is Peter Moglia, Head of Information Security, Aerospace Group, Hughes Aircraft. And I saved for last, the fellow most of all we could not have operated without, our Program Chairman, Lorry McConnell, from System Development Corporation. Thank you very much.

MAY: With your kind attention, I would like to move on to the essential portion of this session. That is to present our guest of honor for today. Our guest earned his B.S. degree in mechanical engineering at the City College of New York in 1944. In 1950 he was awarded an M.S. degree in aeronautical engineering at Case Institute of Technology. He is Director of Nuclear Systems and Space Power at NASA. In addition, our guest wears two other very important hats. He is also the Manager of Space Nuclear Propulsion Office, which is an AEC-NASA operation, and Director of the Space Nuclear Systems Division of AEC. As Manager of the Space Nuclear Propulsion Office, he directs all aspects of nuclear rocket propulsion development for NASA and AEC. As Director of Nuclear Systems of NASA's Office of Advanced Research and Technology since November 1961, he manages research, development and flight testing of nuclear electronic power systems and electronic propulsion and testing of nuclear rocket systems. In 1964 this work was expanded to include NASA's solar and chemical power generation systems technology. A little over a year ago, our guest was named Director, Space Nuclear Systems Division of AEC. He administers the space reactor and isotope power systems work including the systems for space nuclear auxiliary power program, commonly know as the SNAP program, and space-directed advance reactor concept activities. He is the author of numerous technical papers and was co-winner of the 1957 Society of Automotive Engineers Man Award for the best paper on aeronautics. It is with a great deal of pleasure and pride, on behalf of the society, that I present to you Mr. Harold Finger.

NUCLEAR SYSTEMS FOR THE FUTURE OF SPACE FLIGHT

by Harold B. Finger

In the close to nine years since the start of the space age, we have developed a hardware capability to explore space, we have provided a chain of fabrication, test, and launch facilities to permit large scale operations, we have established the operational capabilities of communications and weather satellites, navigational satellites have proven their value as an artificial star for our fleets to steer by, a beginning has been made toward a real understanding of the space environment through the investigation of space phenomena that could not be determined except by actual sampling

of that environment, regions of the moon have been photographed in detail, Mars has been photographed at relatively close range so that it no longer represents quite the mysterious red planet it used to, we understand more about man's ability to adapt and operate in space, we have used space as an important instrument of international cooperation through the participation of individuals or agencies of over 70 countries, about 210 universities are participating in our program with 3600 predoctoral trainees being supported by NASA grants at 152 universities, a rapid growth is being realized in the number of innovations developed through space activities that have potential commercial value. We have come a long way from the low point in 1957 when our position of technological leadership was cast in serious doubt by the accomplishments of the Soviet Union in space.

But we have not yet achieved the "clearly leading role in space achievement, which in many ways may hold the key to our future on earth" that was called for by President Kennedy in his 1961 message on urgent national goals, and that has been reaffirmed by President Johnson. We cannot yet be sure that we will land men on the moon in this decade or that we will be the first to do so. Even if we are first in landing on the moon, Soviet activities offer us no basis for assuming that we will retain the leadership that such a "first" would imply. The Russian effort in space is strong; it is growing; it is thorough; it is broadly based; it constitutes a larger commitment as a percentage of the gross national product than does ours. In 1965 alone, the Russians launched 63 spacecraft—more than the combined total of the two preceding years. So far this year, they have launched 24 spacecraft.

Our space effort is now at its peak and is starting to decline. The missions we laid out in the early years of the space program are now nearing accomplishment. Mercury, Echo, Tiros, Nimbus, OGO, OAO, Ranger, Surveyor, Lunar Orbiter, Gemini, Biosatellite, are among the many missions that are either already completed or will be completed in the next year or two. In fact, the approved program plan now shows a rapid decrease in launches after 1967, to only two Mars Mariner flights in 1969, a few relatively small scientific and technology missions, and several flights in the Apollo program. Even Apollo, the major effort to land the first men on the moon in this decade, is now at its peak level of effort and is beginning to decrease. The first manned Apollo spacecraft flight in orbit is scheduled for 1967 and it is hoped that the first lunar landing will be accomplished in 1969.

The basic questions then are: "What will our space program be called upon to accomplish beyond the currently approved missions? How will continuity of the U.S. accomplishment in space be assured and a flight gap be avoided, so that space does not become solely a Soviet area of achievement? Will this country's varied interests and commitments to our people and to the world include the establishment of new space goals — beyond Apollo — that will assure

our leading role in space and in the world? Will our space exploration capabilities be fully utilized or allowed to disband?"

It is already too late to assure continuity of space accomplishment with any new major mission goals at a rate as high as we have been experiencing. With the long development lead times involved, no new mission objective that requires major new hardware could be developed to carry on the high level of manned space flights achieved in Mercury, Gemini, and Apollo, or to carry on the high rate of activity being maintained in our unmanned space science and our satellite applications flight program.

Only by using systems that are available or are being developed for the currently approved missions will we be able to provide some level of space program continuity. Fortunately, our current program is providing a strong capability for space activity in systems such as the Apollo spacecraft, the Lunar Excursion Module (LEM) that will carry the men to the surface of the moon, the Saturn V vehicle that will launch the Apollo-LEM system on the lunar landing trip, and the Saturn IB vehicle that will be used to launch the Apollo spacecraft into an earth orbit for flight testing. We must use these systems if we are not to retreat to simply an observer role in space.

The goal of the Apollo Applications Program (AAP) that is being proposed is to define enough significant space experiments that will use available hardware to provide needed data for future missions and that will assure continuity of space activity until new missions that are defined can be developed and start their flight activities. AAP therefore can play an important role in this country's space program if we are to appear truly competitive in this area of technological achievement.

Of course, the definition of meaningful experiments for AAP requires that potential future space objectives be identified. Only in this way can experiments be designed that will answer specific questions associated with major new space undertakings. The answers to such questions could then give us a basis for actively undertaking such future missions.

Among the major undertakings that have been suggested for our follow-on, post-Apollo program is planetary exploration leading eventually to manned exploration of Mars, and, if it turns out to be hospitable, Venus. Such a program would be a long term effort including unmanned flights to Mars and Venus and the other planets with well instrumented spacecraft, manned Earth orbiting research laboratories and space stations having an operating crew of at least six to 12 and perhaps as large as 20 or 30 members, manned planetary flyby and orbiter missions from which unmanned capsules could be landed on the planet, and, finally, manned landings on Mars, and, if possible, on Venus.

Such a broad planetary exploration program would certainly provide an umbrella and a focus for a long term, broadly based, challenging space program. It would challenge technology; it would require increased capabilities in almost all of our technological

disciplines and in our basic capability to travel in space; it would provide a vast fund of scientific knowledge and understanding of the solar system; it would help to provide a better understanding of the origin of life; it would maintain the vital challenge that generated the interest of all of our people and particularly our young in science and engineering; it would have a significant effect on our relations with the other countries of the world and could become an important force toward cooperation and unity.

In the conduct of such a total planetary mission program, nuclear energy would play an important role. Nuclear systems now under development and systems based on technology that is now being developed would be required to provide power and propulsion for the wide variety of missions that would be required in this total effort.

Such a total program plan would have to start with unmanned spacecraft sent to the planets. Voyager is the name of the program aimed at exploring the planets with such large, heavily instrumented, unmanned spacecraft. These spacecraft would orbit the planet and drop small capsules to the surface of the planet to measure surface and atmospheric characteristics and to initiate work aimed at detecting life.

The availability of power for the orbiting and landing capsules is one area that requires further development. Solar energy at Mars is only one-half the amount available at Earth. Therefore, solar cell panels that convert solar energy to electrical power become large in area although they are still feasible. However, on the surface of Mars with its limited available solar energy, and at the more distant planets such as Jupiter, where the solar energy is reduced to 1/25th of that of Earth, other power systems must be provided. The AEC is now working with the NASA Jet Propulsion Laboratory to determine how nuclear radioisotope heated electric power systems could be incorporated into the Mars orbiting Voyager spacecraft system, and, most important, into the Mars landing capsules. For those applications we may need several hundred watts of electrical power.

In these radioisotope power systems, the energy of the charged particles emitted by radioactive isotopes is converted to heat as the charged particles are absorbed within the fuel capsule; this is then used to heat the hot side of a thermoelectric element which converts the heat directly to electrical energy.

Radioisotope heated systems using thermoelectric conversion of the heat to electricity are not new. Four of these systems have already been used in Department of Defense space flight missions at powers of three watts and 25 watts. One of the three-watt units has been operating in space for over five years. The AEC has also contracted for the development of such radioisotope power systems for the NASA Nimbus weather satellite and for the Apollo experiments that will be placed on the moon by our astronauts. In addition, the AEC is initiating the development of a 400-watt isotope power supply based on interest expressed by the DoD which may be

of value in a wide variety of future space missions.

An important point in this connection is that the development of a particular system for a particular mission leads inevitably to the use of that system in other missions. This is one of the major justifications for initiating advanced developments that can then be available for application in a wide variety of flights. For example, the 25-watt SNAP-19 radioisotope powered system is being developed by the AEC at the request of NASA for the Nimbus program and is scheduled to be launched late in 1967. During the course of this development, the AEC received an urgent request for a power supply required in a matter of months for another application. With minor modifications, the SNAP-19 system was made available to meet this high priority program need. In addition, discussions are now being held with DoD agencies that have expressed their interest in the SNAP-19 generators for the DoDGE-M satellite. This is a multi-purpose experimental satellite being studied by the DoD.

Incidentally, it is obvious under such circumstances, that a consistent approach to classification is required among the agencies involved.

Another important element of a total planetary exploration program plan is the requirement to conduct enough research in Earth orbit to assure that men and equipment can operate in space for periods of at least several hundred days which are the normal trip times for round trip visits to Mars. The Gemini, MOL, and Apollo systems are a step in this direction. Gemini is providing, and MOL and Apollo will provide, much of the operating experience that will guide the large orbital laboratory design and operation. These larger earth orbital laboratories will be required to conduct astronomical and other space sciences experiments as well as technological and biomedical experiments in orbit. Such orbital space stations will also eventually be needed as orbital assembly and checkout stations for the large interplanetary vehicles.

An orbital laboratory operation of the growth magnitude I have implied would require the availability of large amounts of electric power that could be provided most satisfactorily by nuclear energy systems that are under investigation. The early versions of these laboratories might need 10 kilowatts of electric power for which radioisotopes would still logically provide the heat energy required. However, instead of using direct conversion thermoelectric elements which have an efficiency of only about 5 per cent, Brayton cycle gas turbine-alternator systems having efficiencies as high as 25 to 30 per cent are being developed and would be used. Strong interest has been expressed in these systems by various DoD agencies and by NASA . The AEC is now developing the technology of the isotope heat source and the special fuel and containment materials needed for such systems. NASA is developing the technology of the gas turbine type of conversion equipment.

The later versions of these orbital laboratories will undoubtedly grow in power requirements to at least the 30 kilowatts that is the initial develop-

ment target of the SNAP-8 nuclear reactor-mercury Rankine turboalternator system. With continued support, and wtih technical success in the program, this electric power system should be available for such a large laboratory operation by the mid-70's. However, its growth version of 50 electric kilowatts and even systems of several hundred kilowatts will also be needed if significant orbital test, research, and fabrication operations are to be effectively conducted with the orbital station as a base. Nuclear energy would be an essential requirement for the long term growth and utility of such large orbital operations.

Manned planetary operations will probably start with flyby missions and/or missions into an eccentric orbit around the planet. These missions would provide the means to check out much of the spacecraft and propulsion hardware that would be needed for the later manned landings on the planets. In addition, these missions may provide an assist to the unmanned planetary exploration missions by guiding instrumented capsules to precise locations on the surface of the planet, recording large amounts of detailed data including detailed pictures of the planet that could then be brought back by the returning astronauts. Such a mission could, therefore, provide both hardware qualification and scientific data important to the success of the later landing missions.

Substantial advantages result from the use of nuclear rocket propulsion for such missions. For example, analyses have shown that a Mars flyby mission may require that a spacecraft vehicle system weighing almost a million pounds be assembled in Earth orbit if the space propulsion is to be accomplished using the chemical rocket systems that are being used now. However, if nuclear propulsion is to be used, then this weight could be reduced by at least 40 per cent, and, if a high enough nuclear rocket specific impulse is achieved, perhaps by half, to about 500,000 pounds. Two, or at least three, Saturn V launches with assembly in orbit would be required to perform such a nuclear propelled flyby; if the Saturn V were uprated to a payload in Earth orbit of half a million pounds by strapping solid rockets to the basic vehicle, then it may be possible to do the mission with a single Saturn V launch.

In a nuclear rocket propulsion system, a nuclear reactor is used to heat the rocket's hydrogen propellant to high temperatures, producing specific impulse of at least 750 seconds and possibly as high as 950 seconds. This compares with the 425 to 450 seconds specific impulse capability of chemical combustion rockets. In effect, therefore, the nuclear reactor heat source replaces the combustor in the chemical rockets; also there is only one fluid — hydrogen — rather than the bipropellants of liquid chemical rockets.

The use of nuclear rocket propulsion for space missions presents no technical problems. The success that we have had in the joint AEC-NASA program to develop nuclear rockets over the past two years demonstrates the high performance that can be achieved with these systems, their high reliability, the high degree of

understanding we have about them, and, in general, the high level of confidence with which mission commitments can now be made to their use in the space program. I believe that commitments can and should now be made to use nuclear rockets wherever payload weights greater than those of the basic Saturn V vehicle will be required beyond earth orbital missions. These would include direct flight lunar landing missions, planetary flyby missions, and the planetary landing missions. It certainly appears a much wiser long term investment to apply this advanced system as early as possible to derive the benefits of this new technology rather than to make new investments to stretch the older technology.

Since May of 1964, our nuclear rocket program has successfully tested six nuclear rocket reactors and one total breadboard engine. The breadboard engine was run during the first half of this year for a total operating time of almost two hours with about 28 minutes of that time at full power, full thrust and at altitude equivalent impulse of over 750 seconds. The breadboard engine included the reactor, a turbopump system, a regeneratively cooled jet nozzle with a bleed port that drew high temperature hydrogen from the reactor discharge to power the turbine, and an automatic control system. In a reactor test series that was just completed about three weeks ago, we ran a reactor for a half hour at these conditions to obtain detailed information on the reactor components operating at these high performance conditions.

The total integrated operating time on all of our reactor and engine tests has been about 4½ hours. Every single test was successful and met or exceeded its test objectives. This string of successful tests leads to the obvious conclusion that nuclear rockets offer high reliability in addition to extremely high performance and that the development program requirements are well understood and demonstrated. No other advanced propulsion system is as well proven out in development at this time; it is highly improbable that any other one can be available in the time period when manned operations in space may require them. Nuclear rockets provide a major advance in this country's capabilities to explore space and to be a leader in space technology and, as is required by the Space Act, "in the application thereof to the conduct of peaceful activities . . . ."

Beyond the preliminary flyby or eccentric orbit missions, in the total program approach I have described, would come the manned planetary landing missions. These would require extremely large and heavy spacecraft systems with large space propulsion energy requirements. Manned planetary missions present interesting possibilities of using what I might call "space billiards" to make the missions easier (lower energy requirements) and perhaps to make such missions more valuable.

Because the earth and the other planets –for example Mars—do not move in circular orbits around the Sun, different amounts of energy are required to do a Mars mission at different opportunities. As a result, the weight of the total interplanetary nu-

clear rocket propelled space craft system that would have to be assembled in earth orbit for a Mars mission could vary from 1.5 million to almost 5 million pounds. This variation could be reduced to 1.0 to 2.5 million pounds if the route to Mars, or returning from Mars, were designed to pass close to Venus. This space billiard shot would take advantage of the fact that the mass of Venus exerts a gravitation attraction on the spacecraft system that adds or subtracts velocity and can change the direction of flight.

It may be helpful to better understand the role of nuclear propulsion in such missions if I described a manned Mars mission starting from Earth orbit in 1982. Such a timing should be technologically possible. The total spacecraft made up of the Mars Mission Module, the Mars Excursion Module, and the Earth Return Module, and the necessary midcourse and orbital maneuvering propulsion might weigh 300,000 to 350,000 pounds. The three stages of nuclear rockets required to propel this large spacecraft out of Earth orbit, decelerate it into the Mars orbit, and depart from the Mars orbit would weigh almost another 2 million pounds giving a total weight of 2.3 million pounds if space billiards or planetary English is not relied upon. If Venus swingby is used, then the total initial system weight in Earth orbit, including the spacecraft, would be reduced to almost 1.8 million pounds. If the orbital payload capability of Saturn V were increased to about 500,000 pounds (its present designed capability is 250,000 pounds), then this entire system could be placed in orbit using six uprated Saturn V launches and could be assembled in the orbital laboratory assembly station. A preferable approach would probably require the development of a post-Saturn launch vehicle having an orbital payload of at least a million pounds to reduce orbital assembly operations.

In any case, the three stages of the space vehicle assembled in Earth orbit would use the same nuclear rocket engine having a thrust of 200,000 to 250,000 pounds and a specific impulse of about 800 to 850 seconds. The orbital departure stage would use a cluster of two or three nuclear propulsion modules while the other two stages would each use a single propulsion module.

The first stage would fire for about 30 minutes (as I pointed out earlier, such operating times have already been achieved in ground tests) and would accelerate the spacecraft to a velocity of approximately 40,000 feet per second relative to Earth. As it escapes the Earth's gravitational field, the spacecraft joins the family of planets in our solar system racing around the sun. With its carefully planned trajectory, the spacecraft will "catch-up" to Mars and be "caught up" by the Martian gravitational field. As Mars is approached, a gradual increase in velocity relative to Mars will occur until a value over 20,000 feet per second is reached when the spacecraft comes to its clos-

est approach to the surface of Mars. Then, the second nuclear rocket stage would slow down the spacecraft until it achieves the Mars orbital velocity of about 10,000 feet per second. This part of the trip to Mars would take about 220 days. (As a follow-on improvement, nuclear reactor electric propulsion systems could be used to provide some mission improvement if they can be developed to give high enough performance). Six or perhaps seven members of a ten man crew would be landed on the surface of Mars in the chemically propelled Mars Excursion Module (MEM). After about 30 or 40 days of exploration, they would return to the orbiting spacecraft for the 200 day trip back to Earth.

This kind of a mission certainly sounds difficult, and it is. However, with a properly planned total program, including the necessary attention to the development of all of the required technology in addition to carrying out the necessary precursor missions, some of which I have briefly discussed, this mission should be no harder to do in the early part of the decade of the 80's than is the lunar landing mission in this decade.

This is the broad outline of one total program plan that I believe can be established. It is not, however, an approved space program plan.

Before closing, I would like to recognize the obvious; a strong space capability is not enough for this country if it is to effectively carry out its responsibilities at home and throughout the world. It must be strong and advanced in all fields; it must project an over-all image of strength, progress, concern for justice and human welfare. It must be militarily strong, it must be scientifically advanced and searching, it must be economically sound. None of our people must be deprived of the essentials of good living and opportunity—the opportunity for education, for productive and challenging work, for good homes, and for pleasant surroundings—must be available to all. This kind of a total image is not easy to establish. All of these national requirements add up to heavy demands on our resources that must be properly balanced.

In this balance, we would certainly anticipate that the capability that has been established for space exploration will be effectively utilized and expanded to assure our leadership position. In receiving the Robert H. Goddard Trophy earlier this year, President Johnson said, ". . . so long as I am in public office, I am going to do everything within my power and my capability to prevent us from falling behind . . . The whole Nation now understands the true significance of America's space efforts. The story of man's advancement down through the ages is, of course, the story of his victories over the forces of nature. The health and comfort he enjoys, the leisure he possesses, the abundance of food he eats, all of these are the result of his unending determination to probe the secrets of the world around him.

"In 1958 when we introduced the legislation to create the National

Aeronautics and Space Administration, I said in the Senate at that time, 'I believe that the development of the space age will bring the beginning of the longest and greatest boom of abundance and prosperity in the history of man.'

"Time is bringing out that belief. The future belongs to those of faith, daring, and vision . . . ."

PANEL – SCIENCE AND TECHNOLOGY, AND CLASSIFICATION MANAGEMENT

RICHARD BOBERG: Ladies and gentlemen, let me welcome you to our afternoon session. Our first item for this afternoon will be a series of presentations and a discussion period on the subject of Classification Management, Science and Technology, which happens to be the theme of our seminar. The panel for the afternoon will be moderated by our own Dr. Les Redman. I see from the notes that Dr. Redman so kindly gave me that he also is a graduate of Amherst College. I say "also" because, as you recall, Don Woodbridge was an Amherst graduate. I wonder if they teach classification management down there. Dr. Redman did his work for his Ph. D. at MIT. He worked in research in the Manhattan District during the war, and he was with Monsanto Chemical Company from 1946 to 1949 doing industrial chemistry research. He then returned to the nuclear energy field at Los Alamos Scientific Laboratory, University of California, in New Mexico where he still toils. Dr. Redman, as I think he has previously been described to you, is a Director of our national society and in addition –and I believe this to be a great plus factor in his favor –he is the editor of our *Journal*. He is, in addition, a registered patent agent, a member of the American Nuclear Society, a fellow in the American Institute of Chemists, a member of the American Association for the Advancement of Science, and of the Special Libraries Association. I indicated to Les, when I first read this over, about five minutes ago, that he is dealing with a Swede, and Swedes pronounce their "J's" as in Yune and Yuly. In any case I am going to make an attempt at these: He is interested in conservation of water and wild life in New Mexico and is a Commissioner of the Acequia Del Caño and is President of the Board of Directors of the Pojoaque Water Shed District. I give you Dr. Les Redman.

LESLIE M. REDMAN: The basic point in any discussion of science and technology and classification management was made by Frank Thomas this morning: that a balance must be struck between defense and progress, because there is an unequivocal and unresolvable conflict between them. In this panel, and the discussions that follow, we hope to go into detail about the nature and effects of the interaction between science and technology and classification management. Detail is necessary because of the conflicting nature of the two. We will follow the usual approach of prepared remarks to be followed by discussion and, we hope, a summary of

the situation that is penetrating, inclusive, and conclusive. We expect to exemplify rather than to exhaust — our periods are hardly long enough to do very much in this extensive area. The morality of interfering with free dissemination of scientific information is not usually discussed. It seems to be an ignored fundamental of the essential conflict between science and classification. Classification doesn't prevent research by others. Ideally, it prevents the use of the results of research by those outside the project, or outside of access to the information, which applies in this country as well as in other countries. The point to that is what Frank Thomas talked about. We are standing in our own way, in a deliberate and, we hope, measured way, when we try to apply classification management to science information.

We have three speakers to give us the benefit of some of their experience and thoughts about his general subject.

The first will be Ted Church. He works at the Sandia Corporation, Albuquerque Laboratory. Sandia is the successor to the old Z-Division of the Los Alamos Scientific Laboratory. There has been some discussion about which came first, the chicken or the egg. Ted is extremely unusual in the history of the Los Alamos Scientific Laboratory in that he preceded, that is to say, he was born, raised, and educated in Los Alamos, New Mexico—one of the very few. After finishing the secondary education at the Boys Ranch School there, he went to Harvard University as a civilian but —as Dick has already noted, I am an MIT alumnus—I note with pleasure that Ted went to MIT, after a brief exposure to Harvard, and was graduated from there in 1946 and immediately joined the Los Alamos Scientific Laboratory upon being granted a clearance, in Z-Division at Sandia. He was concerned when he first went there with the development of electronic components for nuclear weapons and he still is. This gives him a twenty-year background in technical, scientific research and development in a classified field—after having had an unclassified experience in Los Alamos, which very few enjoyed. I give you Ted Church, speaking on the responsibilities for classification in technical and scientific projects.

T. S. CHURCH

The classification specialist is usually in a staff position; is busy answering questions as to why certain information was published in the newspaper and yet is treated as classified; is trying to arrange several meetings with suppliers, consultants and the Classification Board; and is a second thought (if thought of at all) to the scientist who is about to disclose a new finding by telephone to a classmate at another company across the nation.

Classification is abhorred more than adopted as an attribute by scientists and engineers. All too often classification becomes a matter of forced interest only at higher management level and then only among a certain few.

Classification is not that bad, is not the impediment so many proclaim it to be. It is lack of knowledge of classification and security practices that

seems to have brought fear and, worse yet, relegation of security to a subconscious or let-it-be-forgotten level in many minds.

A few definitions, possibly not needed for many of this audience, may nevertheless be useful before proceeding further.

Classification is the defining part of information protection. Classification establishes *what* is to be protected. Security establishes *how* classified information and things are to be protected. The degree of protection, the hardware to be used, the practices to be followed in providing access to information, is the province of security. Classification involves the intermingling of information of different kinds from different sources. Classification is involved with physical things to the extent that things may reveal information equally if not better than written documents, drawings, pictures and other communication media.

That certain public information must be protected is a legislative decision, as provided by various espionage laws and the Atomic Energy Act. Governments are not alone in protecting information, as witness industrial security practices. While classification activities administer and interpret the legislative acts, security forces apply the protective machinery.

At times it may appear that emphasis is on preventing information from getting to certain particular recipients rather than protecting the information itself at the source and holding it among those who have a need for it.

The protection of information is not absolute for all time. Time is of the essence in all systems of security. The most tightly protected information eventually becomes released, if not all at once, by degrees, depending on the effectiveness of the security procedures and machinery.

Scientists and engineers in defense work (including the AEC, NASA, DoD and their contractors) are not alone in living with security information. Industrial concerns working in commercial ventures in many cases have more elaborate categories and varying means of access to their proprietary information than does the AEC. Drug and chemical companies, advertising agencies, and even design groups within companies are examples that come to mind. Industry learned long ago that taking out a patent merely publishes the fact that what was patented is indeed possible. What follows are usually successful efforts to copy by varying slightly what was patented, resulting in the benefits accruing to others. Proprietary information is retained under very elaborate systems of industrial security. The information defined by legislative action to be proprietary to the people of the U.S. should be accorded similar management. Defense Information and its special category, Restricted Data, define special information that is proprietary to the nation in the same way as certain information is proprietary to companies and individuals.

A perspective of the technical person's attitude toward classification can be gained from a few major attributes surrounding the job of an engineer, a scientist, or a supervisor of a technical project. If limited to

five factors that are important considerations we invariably find the following listed, and usually in the following order: safety, security, reliability, quality, and cost.

What is meant by these attributes is that they are a part of the job—all of the technical or scientific jobs —all of the time. Safety is usually considered a first consideration; however, there are circumstances where security may come first. This is not to say that cost is the least important aspect of every job, but is usually listed near the end of this list. The current administration's emphasis on cost effectivness alone justifies the placing of cost on this list. (The formalization of value engineering in various companies was not that of adding something new but an admission that engineers had gotten into the habit of forgetting costs—something they were urged to consider in engineering school long ago.) Reliability in this list covers the need to insure that the project or the design will function as intended. Quality covers the design, development, manufacture, maintenance, replacement, retirement processes and their efficiencies. Security in this list covers both the understanding of what is to be protected and why, and also the procedures and mechanisms to be used. Classification is thus a part of security in this list.

Science and technology is a special area of concern to those who manage classification. The engineer, the scientist, the manager and supervisor are the operatives in this area. They are the ones able to weigh the definitions and needs for protecting technical information associated with their tasks —just as they measure costs, balance reliability against complexity, and inject safe features into their designs and projects. Accountants and librarians aid these operatives in their tasks. The classification office is another source of help and coordination. Responsibility for the proper classification of technical information rests with the technical people. They must be educated or oriented to this facet by the classification specialist, much as the safety specialist operates with the line supervisors or foremen, or as the value engineering group teaches groups of engineers cost reduction techniques. The research scientist must assume responsibility for the understanding of classification in his work to the same extent as he stands ready to accept responsibility for the papers he publishes –but which are edited and reviewed by technical writers and journal editors.

The classification specialist is a coordinator as well as an accumulator of the practices of others engaged in the various aspects of classification. He is the point of contact in clarifying the whys and wherefores of the multitude of classification determinations. The final burden of understanding and of changing classification belongs to the person who is creating or altering the information that is classified.

A problem in classification is determining whether certain information is classified or unclassified. Many people approach the determination problem with a preconceived notion that information is unclassified unless proven to be classified. The opposite

approach is also often used, especially in connection with the Restricted Data category provided by the Atomic Energy Act. It is best that this determination be approached analytically, objectively, and as the first order of business. A piece of information is classified or unclassified — not one then the other, until proven otherwise. Whether certain information is secret or confidential is a secondary question whose answer depends on the degree of protection that should be afforded or is required by appropriate regulation or order. The primary question is whether the information is classified or not.

To make a satisfactory determination of classification, one must first be acquainted with what, basically, is being protected. Information concerning a component, for example, may be classified because what it reveals about the next assembly is classified. The fact that the component is classified is not sufficient for basing a determination that any information about the component is classified. An analysis must be made to determine what it is about the component that reveals the information that is classified at the next assembly level. Usually a key part, device, explicit function, or process of combining materials can be found to be the central core on which to base classification determinations.

If classification can be hung on a keystone, the understanding and practice becomes much easier, since further derivative classification determinations can be provided in a logical manner. Technical and scientific personnel who must know what is classified in their area appreciate classification guidance built up in an analytical fashion. Such appreciation carries with it respect.

Classification determination is a continual process in any technical project. Careful review of new and changed information about a project, and its association with other programs, is required. The evolution of new technical information takes place in the technical/scientific area and therefore the first responsibility toward proper classification on a continuing basis is on the shoulders of the scientist, engineer, and technical management.

Not only are classification determinations made within the context of the immediate program, but also on its associations within a larger system of programs. In fact, the associations of a particular program with a larger system of programs may be logically unclassified but the actual or real environment of unrelated programs may imply information that is classified. Frequently, in order to make careful classification determinations, one must detach himself from his own day-to-day entanglements and examine a situation from the point of view of an intelligent outsider, whose primary objective is the seeking of proprietary information of value.

Similarly, a detachment from the immediate activity is necessary to carefully evaluate the usefulness of information. An advanced technical project may attach little value to protecting information that would not represent an advance in its own state-of-the-art, but another company or

another country that has not achieved any art in the particular area would receive significant benefits. These two areas, guilt by association and relative state-of-the-art, are perhaps the most difficult to manage in the classification profession.

Important in the proprietary information context is information implying that a certain technical fact exists, or that a method of performing a technical act is possible. Particularly if the discovery required a great deal of effort in creative brain power or technological support, one should strive for maintaining as classified the revelation of achievement for a period of time commensurate with the value of the discovery. The revelation of success, at a minimum, provides information that effort applied toward a given goal will result in a possible event, while, without such an indication of success, multiple efforts in various directions would be continued by others. The degree of success is, of course, of additional interest to the information seeker.

The effect of classification on research is frequently reported as being depressing. The red tape of security, the suppression of the ability to publish, and the difficulties presented in being able to describe the challenges to potential new workers in a classified field are frequently called out. The fears are there. They have been expressed long and loud. But with proper orientation of technical personnel in classification and its management, and with support by classification specialists in disentangling the basis, or the *why* of classification, many of the fears can be laid to rest. Also, there are many unclassified features about most classified projects.

Facts of nature are basically unclassified. The goal of research is the discovery of facts of nature. The application of newly discovered facts of nature for a company's or a nation's benefit or protection in the face of adversity must frequently be classified. The largest degree or greatest amount of classified information will be with the company or the nation that is apparently the furthest ahead (by whatever standard of measure). The continuing challenge to advance will continue the need to classify new information, while the predisposition of leaders to help others will result in releasing previously classified information. As humans, all of us must participate in the judgments required for the proper classification of technical information.

REDMAN: Dr. Everett Welmers is a native Iowan, educated there and in Michigan. He has been concerned for some time with aerospace professional studies and to some extent with the teaching of mathematics, and has been on the fringe of classified information much of that time. He is currently Assistant for Technical Operations of the Manned Systems Division of Aerospace Corporation here in Los Angeles. Dr. Welmers.

E. T. WELMERS

Out of the 19th Century has come a most fascinating book. It is a fantasy for children written by a distinguished mathematician. It has also become a document of continuing fascination for sophisticated adults. The first editions command rather fabulous prices at least for

books that were published in the last few centuries—and a photo reproduction of one of these first editions has turned out to be almost a best seller. Characters like Tweedledum, Tweedledee, the Mad Hatter, and the Queen of Hearts, have attained the status of classics. I'd like to paraphrase the title of the Lewis Carroll masterpiece this afternoon, and talk of "Science in CS Land," or "Through The Looking Glass." If only I could be assured that there were no foreign nationals in the audience, I could disclose that "CS" stands for "classification security" and that the title, therefore, is "Science in Classification Securityland."

Now there is one more preliminary. My chief qualification for appearance before this society really wasn't mentioned. At Aerospace Corporation, there were lists of classified document hoardings by members of the technical staff. The name attached to the longest list was obviously the candidate. So I am here. By Monday I hope to reduce my holdings at least 75%.

Now, first of all, I'd like to observe some reflections in this looking glass to see what technology and engineers, what science and scientists, are really like. I suppose that many of you are in a much better position to observe this than I am, but at least give me a chance to make a few of my own comments and my own reactions. Then we will break through and observe the interactions that this scientific world has with the world of classification and security.

The first of these reflections in this looking glass that I'd like to say something about is that there are various stages that can be detected in this scientific world. Very early in the stage of scientific development of a particular idea or a particular system, we find that most of the basic work is fundamental physics, chemistry, mathematics, or fundamental science of some type. As was already mentioned, one of these things is very difficult to classify because it is inherently and fundamentally part of the universe itself. As long as there is universe around us, people are going to observe. And with intelligent observation there will be scientific discoveries.

Scientists at this stage are very anxious to publish. They will talk to each other and to technical societies, write books, and most of this, perhaps, is completely beyond the pale of any classification or security control —and should be. But still, there are certain indications, even at this stage, as to what the development of the future may be. We begin to talk in terms of masers and before very long someone changes the microwave, "m", of a maser, to the light "l" of a laser, and begins to realize that there ought to be such a thing as a laser possible.

By now, the applications of a laser to a weapon system may be very, very highly classified, but the fundamental idea, the fundamental research, the fundamental scientific discovery, that leads to this concept is certainly something that is widespread, that has been contributed in all types of literature, and that cannot easily be controlled. One of the challenges that we face in looking at military system is to try to extrapolate from

some of these fundamental discoveries and the interests of an enemy as to what their weapon systems may be ten, fifteen, or twenty years from now. Once in a while we are mildly successful.

When we get to the next stage in the proceedings, we begin to see that the scientist has moved a little bit closer to a laboratory and has called in some technical assistance, some engineers, some technicians, and now we begin a development phase. At this phase we find that it is much easier to carry out this type of control, and we find that the precise application is beginning to be noted. As a result, it is possible for much of this work to go underground, to be tightly controlled, without having the scientist really mind too much.

Finally, when we get to an operational stage, a usefulness, an application, then again this idea, this concept, begins to force itself up out of the darkness and it becomes somewhat more visible.

So the first one of these reflections that I would like to note is that there is a variety of stages in any kind of scientific development. Each stage has to be handled and looked at in a somewhat different fashion.

Then, too, there is a variety of programs. I suppose in a place like Aerospace, where we are closely associated with much of the ballistic missile and space activities with the United States Air Force, this variety becomes almost overpowering. This variety ranges from things that are in the newspaper every day, such as a Gemini launch or a Titan III launch, to some of the most highly classified programs that exist anywhere in the country. The variety is stupendous. This causes a certain amount of confusion and a certain challenge, both from security and from scientific and technological points of view.

This is made somewhat more confusing and somewhat more difficult by the fact that it is very difficult to classify scientists and engineers, and to handle them all the same way. There is a variety of individuals that are involved. Most of you, I am sure, that are in the security side of the business realize we are a batch of very, very unpredictable, and impossible, individuals in most cases.

A further problem that exists, a further reflection that can be noticed in this looking glass, is the fact that within this world of science and technology, there are a wide variety and number of compartments and walls, little rooms, in which these scientists tend to live. As already mentioned today, probably several times, perhaps security and classification restrictions are not too critical in this particular field. But, there are some things that are extremely critical that tend to raise these compartments almost to the heavens themselves and make it almost impossible for individuals to move out of them. One of these is the fact that science today is becoming so highly specialized. One scientist almost can't talk to anyone else. It's a rather shocking thing to go to a mathematics meeting and find that although I am a mathematician by background, if I go to one of the specialists' sessions, there is almost nothing that I can understand. The specialized mathematician perhaps

can talk intelligently to half a dozen of his colleagues across the world, and this is all. And to a large extent, this same thing stretches across all fields of science, whether it's the infrared spectroscopist that knows very little about what the ultraviolet spectroscopist does, or the individual that is interested in one of the peculiar types of chemical compounds who has almost never heard of something in the other end of the atomic table, or the individual that is a specialist in reentry vehicles of high ballistic coefficient or one that is interested in reentry vehicles of low ballistic coefficient. All of these things have tended to raise compartments with walls that almost reach the heavens themselves.

There is a technical specialization that works to eliminate the cross fertilization that existed in so many cases in the past. The day of the universal genius like Leonardo Da Vinci is probably gone forever. I think perhaps I almost knew one at one time. A man by the name of Johnnie Von Neumann. He died just a few years ago. He knew enough about quantum mechanics to write a book on the subject. He knew enough about my own field of operational mathematics to contribute very heavily in that field. He was the one that chaired the committee that recommended that a ballistic missile be developed by the United States, and who contributed most heavily to the theory of computers and was a co-author of a book on Theory of Gains and Economic Behavior. There are very, very few such.

There is this problem of walls and compartments of technical specialization as well as the walls of classification boundaries within this scientific and technical world, which you people know so much about. It is no longer possible to use the words of Lewis Carroll and say:

"The time has come," the Walrus
said,
"To talk of many things;
Of shoes and ships and sealing-wax,
And cabbages and kings."

within these scientific walls. We don't understand what shoes are if we happen to be specialists in ships. Nor do we understand what cabbages are; they are usually classified, so that someone specialized in kings just can't possibly discuss them.

If we try to break through this looking glass and worry about what happens on the other side, the scientific and classification region, there are a few things that perhaps are most important to the scientific mind. One of them is perhaps best described as the significance of the trivial. The scientist may spend countless hours and days and weeks and months perfecting the most ridiculously trivial thing associated with his own research or his own activity. But, just because he is so preoccupied with so much of his own trivia, he recognizes the trivia of security and classification a little bit more easily and he rises up in holy horror and wrath when he discovers that there is something that is being done in this Classification Security-land that isn't quite as important as he thinks it ought to be. So, he attaches unusual significance to these trivial kinds of regulations and rules, to these trivial decisions that are so often made--admittedly, I think we

all have to agree — and never, but never, forgets them. He may forget the simplest mathematical formulas when he is trying to explain something in a technical meeting, or he may find it impossible to communicate the significant thing about his research to one of his fellows. But he never, but never, forgets one of the trivial things that occurs in the name of security or classification. I suppose, too, that he has an unusual ability to apply the most sophisticated logic to the security area—an application that he quite often neglects in his own field. Because somehow, he looks up to you people as being individuals who ought to be able to do things right, who ought to be able to do things in a precise, logical fashion: and if you don't, woe, but woe, be unto you. So although he isn't always willing to apply this same regulation to his own field, he is very willing and anxious and insistent that it be applied to yours.

Now, this, of course, carries with it a sizeable amount of danger. It causes a certain amount of breakdown in communication between you and the scientist. This is highly unfortunate, but one of the facts of life. I suppose that across the door of this looking glass we find that there is a very critical interface of understanding. I have accused scientists, for a good many years, of being highly uncommunicative to the non-scientific world. I am accusing them, as I mentioned, of being uncommunicative as far as their own scientific world is concerned. How in the world can we then break down this interface of understanding? I suppose that he tells the classification specialist, "'Won't you walk a little faster . . .' Let's get this stuff done. Let's do something. Let's move." And yet, he finds it almost impossible to sit down and patiently —with a certain amount of imagination, at least—go through some of the fundamental scientific and technical problems with which he is faced, and ask that they be logically interpreted, that they be handled in an other than trivial fashion, and that there be some genuine communication.

I have noted that I think that a lot of this is, therefore, the problem of the scientist and the technical man. I suppose, too, I ought to go on the other side and say that there is the interface that operates from the other direction as well. In a good many cases I have been talking to individuals, educators, professional people of various kinds, and when they hear that I am a mathematician there is one uniform reaction. Their hands fly up in horror and their comment is immediate: "Well that is something that I could never understand." I think that in a lot of areas, it's becoming absolutely essential that the non-specialist, the non-scientist, begin to really try to understand some of these things that are going on in the world about us. I think of the man on the street, who can look at some of the statistical manipulations involved in some of the ball scores - for example, "the other day there was a right handed pitcher who won a game; this was the first time that this had been done by the pitcher himself hitting two home runs in the American League in 29½ years." Or some-

thing like that. The proliferation of this statistical trivia, and the willingness with which the American populace swallows it, make me feel that they are a group of frustrated statisticians. So let's exploit some of this ability once in a while. There are some interesting things in mathematics and physics and chemistry and biology that, if one investigates just a little bit, will be found very, very worthwhile.

So, I think that perhaps this happens on both sides of the fence. The scientist thinks that the sort of thing he is working on just can't be explained, and I don't believe it. On the other side of the fence, the non-scientist thinks that it can't be understood, and I don't believe him either. I believe that there is an interface of understanding here that has to be very, very carefully cultivated. The problems in this area have to be resolved and they take a sizeable amount of patience on both sides.

I have tried to indicate that there are some reflections in this looking glass; that scientists and engineers, science and technology, go through a variety of stages; that there are a number of programs; that individuals aren't all the same; and that there are lots of compartments and walls, not all of which, in fact few of which, have anything at all to do with security and classification. Yet, we have to watch out as we break through this looking glass. We have to watch out as to how badly the trivial things are blown up, and how often we like to apply logic for the other fellow even though we may not apply it for ourselves. There is a very important interface of understanding here that can be resolved. Problems can be answered, if we are willing to utilize a little bit of patience and a little bit of ingenuity on both sides. Thank you.

REDMAN: Our third speaker is Sid Fernbach, from the Lawrence Radiation Laboratory, Livermore. He is a theoretical physicist who has been concerned with the application of computers to the solution of the variety of problems that a nuclear research laboratory like LRL gets into. He started as a physicist in weaponry back with the smokeless powder and has come along to nuclear weapons. One association here might as well be brought up also. He and I tangled ten years ago over whether it's possible to extrapolate a linear relationship by one atomic number. It was a situation where we were bound by rules rather than scientific judgment. Sid Fernbach.

SIDNEY FERNBACH

Thank you. As Dr. Redman implied, I shall never forget that. It was about ten years ago, I carried out a calculation that was purely theoretical and could have been done anywhere in any laboratory in the country, but it was classified because I had mentioned an unmentionable element. It took two years to get it unclassified.

What I'd like to do is just to take the point of view of the scientist and present that to you. I am sure you have heard the story many, many times before, but I would like to reemphasize it because there are actually many problems involved.

At the laboratory I have been involved in hiring and working with

scientists, and very often it comes to one's attention that they dislike to work in classified areas. Almost every one of them refuses to work in a classified area if he can find some way in getting out of it. Very often it's the unavailability of an academic position or perhaps more dollars involved that makes him take a position that does involve some kind of security classification. Even then he tries to avoid the classified work, and sort of seeks the continuation of the dissertation, and finds any number of tricks to keep in the pure physics or pure science realm. The reason for doing this is that you can still communicate with the outside world in pure science. There are many journals and publications. He publishes articles, and keeps in touch with what other people are doing in a similar field. Even though there is so much being published in the world, he finds that in the classified area this contact no longer is available to him, and he misses it. He loses the chance to invent new ideas, or at least he thinks he does. Even within a given facility, he has little chance to interact with all the people because there seems to be the need to know criterion which keeps this interaction down to a minimum. Far more progress is actually evidenced in the unclassified fields of research than in the classified ones. And much of this is due to the freedom to discuss and publish information. Some of this could be transferred to the classified field if there were an easing of the principle of need to know, or if even there were possible a publication of a classified journal. I know this sounds kind of strange and I am not quite sure how one would do this, but there could be a series of classified journals covering different levels of information and different categories of work in security areas.

Another difficulty the man finds is that declassification of documents becomes very difficult. At present the law has been changed so that it's possible to declassify some documents after a given period of time, and others are scrutinized by a group of people more frequently than in the past. But it is not always the proper material that is declassified as far as the scientist is concerned. Sometimes you find that a small item buried in a classified report is of great importance and this item is lost in the classified document. When such a small item appears in the unclassified literature, someone finds it out and uses it. But, if it's an unclassified item and it's in a classified document, it is gone forever. So we lose so much in the way of publications in the area of classification that I believe we should take another look at the possibility of regaining this in some fashion.

If we can publish a journal, or journals, and if we can accelerate the declassification process, we may be able to accomplish an awful lot in this area.

In most academic institutions, and also in some industrial facilities, promotions and other rewards are based on publications in open literature. Even though the world is being swamped in paper, the recognition so obtained encourages the scientist to write. Furthermore, the work that he does produce is reviewed by a group

of his peers. In a classified facility, he is discouraged from writing. He actually doesn't put on paper those ideas that should be recorded. Furthermore, because he doesn't prepare the classified document to work from, he doesn't take the trouble to write an unclassified version of it. Very often the individual who does write an unclassified version of his work finds that the classification section of his facility determines it to be classified after all.

The unfortunate situation is that the scientist himself does not really understand what is, or what is not, classified. If it were all black and white, he probably would learn enough to appreciate that and determine for himself whether his work can be considered unclassified. But this is not really so, and the classification guides are not written in such a way that he needs to keep up with what is and what is not classified and how to understand it. Furthermore, when one is employed at a facility at which most work is classified, all documents get reviewed for classification and each scientist *thinks* that he knows whether his work is classified or not, and he responds to the delays and the reviews by the classification section with great anger. He becomes very unhappy in working with classification.

The scientist also tends to be very cautious and, in general, is guilty of overclassifying, rather than underclassifying. This attitude discourages him from thinking about things that are on the borderline of security. When he leaves the laboratory, a scientist very often continues his thinking about his work. Actually, when I talk about the scientist I am talking to you primarily about a theoretical scientist, one who does his research with paper and pencil and thinks about ideas. Well, he takes his ideas home with him. What does he do if he gets a brilliant thought? Does he write notes on paper, bring them in and stamp secret on them the next day? Well, he is restrained from doing this.

There is nothing that hurts the scientist more than reading in a newspaper about the classified matter that he has been working on. If he had given out this information, he would have been subject to prosecution for violation of the security of the country. Very often, however, this information is released by someone in Washington who, not being a scientist, understands even less the significance of the matter.

It seems to me that there should be some sort of a group brought together to really consider the classification of all things in the country, and come up with some good schemes for reducing the volume of material that needs to be classified. I am not arguing that all items should be declassified, or should be considered unclassified, but I believe that we do tend to overclassify most things that we work on.

Another problem the scientist has is that he can't communicate with his own family about the work he is doing if the work is classified. Very often, of course, you find by talking to a man's wife that she knows a good deal more about some of the things than you do. If you were to add up all the information that you get at a cocktail party, you might find that

there is an awful lot of classified information there.

Another unreasonable attitude is when one considers to be classified a statement that a particular group of people is interested in a certain problem. It is true that an enemy agent would infer that this problem should be studied, if this group of people is engaged in classified work. Perhaps some precaution should be taken, but again these are overdone. Sometimes one reads in *Life* magazine that these very problems are important, but of course, we can't admit it. I use as an illustration that case that I mentioned of the problem that I had been working on that took two years to declassify because it involved the wrong element.

There is another serious problem that is coming on the scene right now, and I'd like to spend a little more time in discussing it because it worries me more than most other areas of classification. The advent of the computer has added additional complications, which I personally don't know how to face. I believe that we do have to get some good management in this area. Not only is publication involved, but computer programs, written at great expense to the Government, are redone many times because of the classification problems. It is relatively clear when a written document is born what makes it classified. But it is not so clear when one considers other forms of representing data. Obviously, not all of the document is classified, certainly the words themselves are not, probably not the equations if the paper is mathematical. Perhaps the applications, or numerical values, or descriptions are classified. Now let's consider a code written for a computer which consists first of a representation of a set of equations. These equations couldn't be classified unless they are quite unique. Putting them in some form a computer can digest is not classified either. However, somewhere there exists a number or a series of numbers within the code that might be classified. These items appear on punch cards or magnetic tapes, or on the computer input or output media. Now, what should be considered classified? This is a management problem that desperately needs a solution. The simplest solution is to state that all of it is classified and normally this is what is done. Certainly at our laboratory we consider everything in the computer room as classified. This makes life simple. We need concern ourselves only with the documents we take out of the area. But we do make life unpleasant for the scientist as well as for the computer staff with all these restrictions.

Security requirements for protecting the data make it very difficult to handle. I am sure that things will get worse unless some real steps are taken in this area fairly soon. As a matter of fact, I have been in this computer racket for quite a while, and fifteen years ago I took this problem to Washington. They just laughed at it. They didn't appreciate it. And there is still no solution.

Within the computer facility, life is made difficult for the man who relies on the computer to assist in his work. He now deals with large stacks of classified cards and printouts. He

doesn't have secure space enough to store them. What is primarily classified? Are the equations classified? Are the results classified? Are incorrect answers as classified as correct ones? Can a stack of cards be classified? What makes the stack critical? Are magnetic tapes classified even if erased? These questions are not easy to answer. If everyone treats everything in the computer room as classified, quite an accounting system has to be set up. And then not only are the costs very high, but it becomes impossible to carry out one's work.

At our facility we use 60,000 cards per day. We print twenty miles of paper every day. We store 25,000 magnetic tapes. Now we are trying to communicate from remote stations with the computer. Assuming protection is worth any price if the job is worth doing, the costs could be quite high. However, one should ask if its protection is really meaningful. It is perfectly clear and reasonable that the formulation of a problem may be classified if it contains sensitive data or implies application to be considered sensitive. It's not always certain, however, that the code itself should be classified, or that the deck of cards representing the data need be classified. It is possible that some data cards are classified, depending on the format. Separately, these cards may be just like any other cards with holes in them. Who is to determine this, and how is it best handled? Again it is fairly easy to recognize the black and white cases, but most are varying shades of gray. The idea of topping a deck with a single card indicating the total number of classified cards in the deck makes little sense. It certainly makes card decks awkward to work with.

The problems are obvious. The solutions are not. How does one determine when a customer's printout is classified? If printing is accomplished off-line from magnetic tape input and the printout is classified, the tape itself must be classified. This could be determined only by the creator of the problem. How should one treat the paper and the tape? Both could be logged in and returned and receipts obtained for classified information. Recently some solution was offered—namely, that we punch holes in the tape indicating that it is classified at the front end and at the back end of the tape. Well, this makes the tape useless because it won't operate in the machine. It has also been suggested that you weigh the tapes so that they always should have the same weight. But the first pieces of tape that become worn out you tear off and throw away, so you would keep changing the weight of the tape. Another suggestion was that you measure the length of a tape. But, of course, the tape stretches when it is being used so you have to measure it within a certain number of feet, and classified information could be on a quarter of an inch.

Well, in any case, the scientist is quite involved with the computer today, and he comes up with new ideas, new ways of solving problems, new techniques. But, because of the security problems involved, these techniques don't get outside the laboratory. It turns out that other laboratories could use the results of his tech-

niques or the ideas that he has evolved, but they have no access to these techniques.

Recently, a group of us tried to do something about this by starting a series of journals and books, to try to get these techniques in writing before they are lost, and get them out into the open. Sometimes by classifying things we do more harm to our neighbors and friends than to the enemy. We have to be very careful that we don't find ourselves in that position very often.

REDMAN: That completes the prepared portion of our panel's discussions this afternoon. Leo Lunine is Security Officer at Jet Propulsion Laboratory. He is here to round out the answering capability, but was not imposed on to the extent of giving a talk as well. May I ask for questions, comments, provocations, from the audience. Please use the microphone and identify yourself and your organization for the benefit of the record.

QUESTION: I am Fred Daigle from Lockheed, Sunnyvale. Dr. Church, did I understand, from your comments, that the scientific community is interested in the classification of things to protect information? The general approach that we have been given lately is that classification of information is to protect things. Does this seem to create a problem for you or for the scientific community, that we should understand?

CHURCH: My point there was that scientists and other people need to realize that things do convey information. The information is what's classified.

REDMAN: This indeed goes to the Atomic Energy Act which says, "all information concerning . . ." This is also, I believe, the essence of communicable classification guidance — namely, that the information whose withholding you are concerned with needs to be identified because its embodiment is potentially so varied. And an understanding of what information is in an object is basic to the successful, consistent classification of objects. Classification guidance was formerly phrased in terms of things. We had a line in a nuclear classification guide, for example, which said that tampers are confidential. Well, why? It turned out that some tampers are unclassified and some are secret in terms of the criterion in which the topic was originally formulated. Technical people, I think, feel, by and large, that emphasis should be on the identification of the information withholding of which is desired, and that this is essential to effective guidance.

DON GARRETT: Dr. Wehners, I was very interested in your discussion of the problems of classified research and development. I wonder if you have attempted to develop a definition of a dividing line between what you call fundamental research and application or development?

WEIMERS: I think this is probably much more like a continuous spectrum with a few Fraunhofer lines in it. Once in a while you can identify something very clearly, and say that it is at one end of the spectrum. But in so many cases programs differ quite drastically in this division point. I think it is one of the most interesting and frustrating things that scientists

are trying to do now, to try to identify this boundary between a basic and an applied research, or between a fundamental research and a development application. I don't think it can be stated, except in terms of a specific kind of program, and then you can begin to understand. Take this illustration of a laser that I mentioned. Here I think the fact that it was possible to pump up, by exposure to light, a ruby crystal in such a way that energy was stored in the crystal, then suddenly released by a translation of the atomic pattern from one level to another--this was a fundamental affair. But, almost the next day after this was determined, people were starting to worry about "isn't it going to be possible to apply this to ranging with light?" And laser radar, if you want to use that term, was beginning to be developed. I believe that before lasers ever were demonstrated as being feasible, there were so many applications that were thought of for them that you just phased almost immediately into development activity.

GARRETT: This is very interesting to us because at the present moment we are trying to develop a classification guidance for the classifiers on research activities, and this is one of the things that we have great difficulty in attempting to articulate.

WELMERS: I could easily understand this. I think it's one of the most annoying things that we have got to talk about. We have got to pick various illustrations and so on. But I don't think you can create a single, solitary guide that is going to be universal.

GEORGE MacCLAIN: Dr. Welmers, I was interested in your enumeration of various characteristics of scientists and their relation to classifiers. I wonder if you have an example that you could state of what you seem to say was extrapolating trivia into something awful. I suppose what you were suggesting was that classification is applied to information of small importance when it ought not to be. I wonder if you could clarify that with some example.

WELMERS: I think I remember one or two examples that might be pertinent in this particular regard. In one facility that I was acquainted with, it was possible to hold an unclassified meeting, in a classified facility, in one room; but in the room next to it, it was not. Now, this was one of these affairs that had been set up for perhaps purely logical reasons, but the scientists that tried to schedule a meeting in one of those rooms happened to have picked the wrong one, and just did not understand this sort of thing. It was a rather trivial application of security regulation or classification problem that should never have been allowed to cause any friction. Another such affair is an insistence that a particular page of a report—it was a secret report, admittedly— but a particular page of the report was required to have secret stamped on it. I could go to any one of a dozen books in a library and with about two minutes of calculation produce that particular page. Now, again, this is just one of these affairs where an issue was made of it and it was a completely trivial affair. I know that the scientist involved in that i.

going to be awfully hard to talk to about any critical security problems because such a point was made of this particular affair which was completely illogical and trivial. It is those kinds of things that I mean. We unfortunately tend to just blow up these things and consider them all out of proportion. As a result, some of the real things that you people want to get across, a good many of the scientists and engineers tend to laugh at because, "that's no more important than the trivial thing we raised in issue last week."

REDMAN: I think this might be an illustration of the point I brought up in the beginning -- namely, the moral indignation at the interference of dissemination of information and an attempt to disqualify the interferer from any further activity.

WELMERS. This is the unfortunate point. There is a breakdown of communication as a result of these kinds of instances.

REDMAN: It is gratifying to feel that we have been so inclusive and conclusive to deal with all the problems of the audience that anybody might have had in the area of the interaction of science and technology and classification. If nobody raises a hand we are going to have to break anyway.

BOBERG: I'm not at all sure that the gentlemen on the panel are aware of all the details of what is happening in the field of classification, but let it be said that there is now a requirement for classifying paragraphs within classified documents. I would, myself, appreciate an opinion from any or all of you gentlemen as to the benefit or detriment to accrue to your particular endeavors. Would anybody like to take that one up?

FERNBACH: You mean there is a document marked secret and then individual paragraphs would be so designated?

BOBERG: That is correct, as to their particular classification.

FERNBACH: Would the other paragraphs be marked in any way whatsoever?

REDMAN: Yes, each paragraph of documents, with the possible exception of technical reports, I guess.

MacCLAIN: May I interrupt and make an attempt to state what the rule is? If you have a document of more than one paragraph in length, and this document contains information that is classified anywhere in it, and if the paragraphs within this document do not all have the same level of classification, then it is necessary to take it paragraph by paragraph and mark those that are classified and at what level, and those that are not classified at all. The idea is that this is a form of classification guidance to anyone who picks up the document and reads it. Now, within any paragraph, it doesn't tell you which line or which words are classified, but it gets down to the size of a paragraph.

FERNBACH: I think this is an excellent idea. It would help the author in that as he writes this document and has it reviewed, he might find that he can group some of the classified items onto one page, perhaps, which will enable him to eventually come up with an unclassified section

and a classified section which he might be able to separate.

REDMAN: The mere concern with an area of information is often the essence of what is classified. For example, witness the incident where the mere extrapolation of a linear relationship by one atomic number was the basis for a two-year debate.

MacCLAIN: The idea of paragraph marking is not to say that every document has to be paragraph marked. That, however, is the first choice because when it is possible, it is the best, we think, that you can have. There is a second choice, which includes a statement within the text to identify, in language, what is classified, including the reason. Or you can attach a classification guide. I would not like anyone to think that there has been a segregation, or that this marking does not apply to a particular type of document. The difficulty will certainly vary from document to document.

REDMAN: This is a DoD directive rather than an AEC one.

WELMERS: One of the problems in this regard is what is a paragraph. For DoD a paragraph becomes a fairly formal kind of a thing, usually with a number. Science usually doesn't write in paragraphs of this quantization. In some cases, it may be a single sentence or a lengthy one. And it has the danger of becoming confusing.

QUESTION (name not given): I would like to see documents of this type. But is this going to overload the declassification facilities? Are you going to get the documents now or three years from now? It seems like if this goes through on every document, every classified document, that they may be backlogged for years.

REDMAN: I think the first response to that would be that we have had an illustration earlier today of how difficult it has proved for elusive bits of guidance and instructions like Air Force Regulation 205-29 and DoD Directive 5210.47 to be implemented unequivocally. The need is for communication, mutual communication, for guidance that is unequivocal and so persuasive as not to be capable of being ignored. That is the objective of the paragraph classification requirement. In other words, to help anyone who reads the document understand the classification rationale by either of the alternatives that George MacClain explained. As we said before, this is a DoD requirement. The AEC has a different approach. I don't think it is a question of being more mystical, but rather a question of having a different staffing or orientation in a very much more limited and more specific area of information.

WELMERS: I was very much interested in some of the comments regarding the difficulties of recognition in publication. I might mention that the Institute for Defense Analysis is issuing a classified journal quarterly. I wonder if this kind of affair might assist in this problem of both publication and of recognition.

REDMAN: Are you referring to the Journal of Missile Defense Research?

WELMERS: That is right.

REDMAN: The AEC had a journal. However, the classification of that journal receded and it simply

disappeared in favor of a professional society journal in the same area. Professional societies dealing in the area sprang up and offered journals.

QUESTION (name not given): To what extent do you think scientists are driven out of the classified fields by their aversion to classification? And, do we in this way lose the mavericks and the rebels whose brilliance migh otherwise be important in solving our problems?

FERNBACH: It is very hard to put any numbers on it. The Laboratory at Livermore receives applications from what I would classify as second rate people rather than the top people. Whenever you talk to the top people, they go to the universities. They want to pursue academic life. The only exception that I find are those who feel that they can get pure research done at our facility because we have so many computers. But they come to do unclassified work. They don't want to get involved. It is very serious.

REDMAN: Dr. Fernbach is head of both the Theoretical Division and Computer Division at Livermore. We too usually find the same sets of problems. Usually, however, the man either doesn't come to work or if he does he displays his personality rather than his scientific ability.

QUESTION (name not given): I'd like to know if it would be possible to get some sort of opinion from the panel as to how the scientific community would feel about a proposed plan of classification by paragraph or the other proposal mentioned by Mr. MacClain of attaching a classification guide to each document.

FERNBACH: Well, I can't really say anything very definitely in response to that question. One of the things that concerns me is that I feel there is too much being published in both the classified and unclassified fields. I would like to see a requirement for many of these documents to be reduced to the point where the classified part of the document could be very small in size, containing only the matters that are classified. And any ideas that could go into the field of pure science should be then written in a completely unclassified manner for publication somewhere else, thereby getting the best of everything out. Get the unclassified ideas out into the open and get the classified material all in one document. So far as the idea of having a guide along with it is concerned, I think that's good because most of us really don't keep up with the guides on classification. We don't really know what is classified. This would help us in knowing what we can talk about and what we can't talk about.

WELMERS: I think many of our engineers and scientists would hate this business of classification by paragraph. As a result, they would turn it over to one of the editors or secretaries to put classification on it, which does not carry out what you are talking about. Therefore, it is sort of self defeating.

CHURCH: I think the problem gets worse as you get into engineering, production and application. I recall one document in my own experience which was written completely unclassified. One of my staff wrote it, but it was put out under the authorship

of other people. If the real author had been revealed it would have been classified. Sandia is a weapons laboratory and that particular document would have indicated particular interest by Sandia Corporation. This is the problem of the paragraph. When you get into specifications, quantities start being built up and the paragraph unclassified in one context may be classified in another. I worry to death about confusion. This would be adding more fuel to that fire.

MacCLAIN: I know it is very easy to establish objections to a requirement of this kind and to emphasize its undesirable aspects, at least as anticipated. But for those who have actually attempted to use this system it hasn't worked out to be a great disadvantage. I will have to admit that in some context it might be quite impossible to apply on a paragraph by paragraph basis. But what we are hoping is that people will not try to imagine all the possible difficulties but will instead concentrate on the possible advantages that will flow from it. This is simply a question of attitude. I am not trying to criticize anybody for feeling that objections are there. We do want you to try it and we think you will find that it is helpful in a large number of cases. One more thing, just for clarification. Within the industry, or outside the Department of Defense or Government, original classification does not occur, and I just wanted to mention that this paragraph marking requirement hasn't changed that in any way. We are working in a classified area pursuant to guidance which you have received for classification. All you are doing is applying the guidance on a paragraph by paragraph basis rather than some other basis. We are not asking you to create the guidance simply because you are classifying by paragraph.

AUDIENCE (gentleman from DASA): We, too, were probably objectors to Mr. MacClain's paragraph marking. We had all kinds of reasons why it wasn't going to work. We started it, and I think we are about the only ones really doing it. We are doing paragraph by paragraph and we are gradually finding that it is better if you use the option where you give a one- or two-page classification guidance. As classification information, it does away somewhat with this context business. I am here to say that I am with Mr. MacClain one hundred percent.

LES AYRES, ACDA: I want to add some fuel to this flame from the smallest outfit. When you are only fourth place, you have to try even harder. My predecessor, Dick Durham, instituted a paragraph by paragraph classification requirement in several contracts which have now rolled through their lifetime. About three weeks ago I sat down with the Midwest Research Institute people and went through a stack of papers that came to about eleven or twelve inches. In one afternoon, the project officer, three authors, the program director, and I completely reviewed for classification purposes two diverse subjects—the chemical warfare field and the biological warfare field. Having the paragraph by paragraph classification there, we were able to do this very quickly and were able to ar-

rive at a meeting of minds because they not only had paragraph classification, but in this case there were notes in pencil at each paragraph as to the rationale. For example, "This came from paragraph 10 of the classification guide," or "We just think this is confidential, we would like to check this one out with you," or "We don't think this is classified at all." The authors in the beginning thought that this would be a terrible thing and now they are believers because they knew they were going to do it. One man had his cards all arranged by paragraph. Paragraph classification right on each card. They like it. So do we.

MacCLAIN: I have a sneaky feeling that we are losing an opportunity with this panel. I can't quite put my finger on why I feel this way, but there is something in the scientific state of mind or attitude that makes them more difficult to deal with from a classification standpoint than other people. If so, can that be identified?

REDMAN: I think we have to a large extent. That is this basic concern with dissemination and cross fertilization. Perhaps, as Dr. Welmers implied, the lack of realization, per se, has reached such a complexity that the scientist can't understand another scientist let alone communicate with the classification specialist.

MacCLAIN: Is that an observation of our complex way of life?

REDMAN: It is a series of things. The basic concern seems to be an interaction of personality traits, basic tool functioning. As a scientist or a classification person perhaps I am not a good one to say very much since I was one and am now the other. Why are scientists so damn difficult? I think the answer is because science is difficult and the people who work in it necessarily reflect some of it.

FERNBACH: I feel that the scientist probably gets involved in more classified matters and that is why he appears to be more difficult.

WELMERS: This matter is of increasing complexity in the world we live in. There have been some studies of characteristics of scientists. Some of the characteristics no scientist will believe because they are so ridiculous. Of course they happen to be quite factual and they happen to have a lot of things behind them that make a certain amount of sense. But I do believe that scientists are, perhaps, just a little nastier in some of these regards because the kinds of things that they are working with are so directly factual, whereas the kinds of attitudes that have to be assumed in the classification procedure are not quite as easily demonstrable as some scientific developments.

FRANK THOMAS: I'd like to say that the whole training of the scientist is that he likes to see the logic of the situation. It's very difficult for him to see the entire logic of a classification procedure, most of which is out of view. It's much easier for a man on a production line to be told that something is classified and he doesn't question it. The whole scientific viewpoint is to question everything and it is very difficult in a classification matter.

WOODBRIDGE: I'd like to take a small exception. I've been out in the shop many times talking to produc-

tion men, and find them quite as nasty as scientists. You may remember my remark last year when I quoted a particular case where the chap said to me, "Woodbridge, do you know you're costing this plant thousands of dollars a day."

AUDIENCE (name not given): It seems to me that the scientist is the man that everyone else has to look for, and look to, to get the information for classification. He should know lead times, foreign technology, and where this thing that he is working on fits into the environment. He is the man that has to make the major contribution. I think that they cannot, and I'll say that they cannot, do this.

CHURCH: The classification people must involve the scientist.

AUDIENCE (same gentleman): He is the expert.

CHURCH: This is one of the main tasks for you—to find ways of interesting the scientist in your problem.

QUESTION (name not given): How do you go about getting this interest? We have defined the problem, the interface. But let's hear from the scientific community. How would you approach the problem of getting communication between classification and technical people?

CHURCH: From personal experience, I think it is holding a carrot out to the engineer or scientist, and taking time and finding out his interests.

WELMERS: I think that is right. It is a matter of gradual development of some kind of confidence between the two groups. And this is not something that is going to happen automatically. I am not sure but what the best formula might not be two martinis supplied by the classification people.

FERNBACH: I don't think the problem really is so serious. I feel the scientist does cooperate as much as he can if he understands the problem. The real crux of the matter is to get the problem areas across to him.

WELMERS: The contact has to be made relatively early. It is very unfortunate if a program gets months and months down the line and suddenly a classification structure is imposed on it. This has to be developed right from the start of the program with the scientist and classification man together.

GEORGE CHELIUS: Dr. Welmers, we have been speaking now for pure research moving into application. At the time you start application the probability is that you will not have a contract. Without a contract, from a contractor's standpoint, you don't have the right to apply classification. How would you then determine how this should be applied? Or what classification would you assign? Let's take for example, countermeasures? Perhaps Mr. MacClain could answer that also.

REDMAN: Let me interpose and offer one comment in that area. There seems to be an essentially fatal deficiency in the handling of technical information of long term value where the Atomic Energy Act specifies that it is born classified in a way that the scientist recognizes to be incompatible with fact, and where the Defense attack on the problem is to say that only official information requires

classification. You are taking, I believe, the specific point that the information isn't official if you don't have a contract. No contract, no classification. That is the essence. There is not a well worked out scheme in this country for the handling of technical information of lasting value.

WELMERS: I think this is a very important problem and I agree I don't think it's been resolved. I think it is a matter of the contractor who has to more or less continue along in some kind of extrapolated form where he moves from a study that is, perhaps, a funded study to an interim activity on his own leading towards, eventually, he hopes, a contract that will establish the appropriate classification. I don't believe it is properly resolved. I think we are talking about IDR&E and going from pure science into application rather than contractual relationships.

REDMAN: Well, since the Department of Defense Directive deals with official information only, I think you identified that particular problem.

A. M. STELLE, JR., Atomics International: I don't know whether it's a universal thing throughout the industry, but we have a "purgatory" classification when we say "classification pending," indicating the document will be afforded the same protection as an official Government document would be handled. Then we process this document at the proper time through normal Government channels. At that time, the Government could make up its mind whether the material should be classified or not. And, if it is classified, it has had appropriate protection up to that point.

MacCLAIN: I don't wish to have the last word, necessarily, but time may be running out and I want to give our two cents worth on this question of what is official information. The Executive Order talks in terms of official information, so that sets it outside the perimeter. We define official information as being information owned or controlled in whole or in part by the Government. Obviously, if you start out in a green pasture with some idea and develop it, then that is not official information. But even despite the fact that it is not official information, if you are a sophisticated individual you may realize that it is of value to the national defense, and under those circumstances you may seek an avenue of bringing it within Government control by contract or otherwise. In the meantime, though, we would urge that you don't forget the fact that you are subject to those laws that protect information of this kind whether it's classified or not. There is one law, the Espionage Law, that says that if you have information which you have reason to believe is of value to the other side and you disclose it under those circumstances, you may become a violator of the law. That's because of the nature of the information and not whether it is classified or not. If you think it is classified, you are urged to protect it and for this purpose, put an appropriate tag on it. That's the last two cents of that.

REDMAN: I will return the meeting to its chairman.

BOBERG: Captain Robert Taylor

is working towards his master's degree on the subject of classification management. We felt that no more appropriate speaker could grace this podium than a man who has initiated a study in this field. I expect Captain Taylor will be able to tell us a number of things about ourselves that perhaps we don't know, and I want you to know a few more things about him before we get him up here. He was a 1961 graduate of Allegheny College. His first assignment was as an Air Police Officer in the SAC base at Wright-Patterson Air Force Base, and after eighteen months he entered the Minuteman program at Ellsworth Air Force Base in South Dakota. Since June of 1963, Captain Taylor has been a Minuteman launch control officer attached to the 44th Strategic Missile Wing, which is in SAC, and has been participating in off-duty education conducted by Ohio State University in conjunction with the Air Force Institute of Technology. This program leads to an MBA degree in Industrial Management. He expects to be graduated in December of this year. His work towards his degree includes a study and a survey of the classification management field. Ladies and gentlemen, it gives me great pleasure to introduce Captain Robert Taylor.

PRESENTATION—A CLASSIFICATION MANAGEMENT SURVEY
by Capt. Robert L. Taylor, USAF

On the first of July, 125 questionnaires were sent to representatives of over 100 defense contractors. Firms ranged from the giants of industry to the smallest facilities. Hardware producers, research and development contractors, and some non-profit firms are represented. No attempt was made to contact every DoD contractor as this would be an impossible task. The final list of those contacted was drawn as a statistical sample, representative of DoD contractors handling classified contracts, with a possible bias for those being interested in classification and security. This latter is true to the extent that names were selected from the membership lists of this society and the American Society for Industrial Security.

At the outset, it must be emphasized that this is *not* an official government questionnaire, but is in conjunction with the Ohio State University and the Air Force Institute of Technology. The survey is in support of my MBA thesis entitled, "Classification Management in Defense-oriented Companies." The objective of the thesis is to affirm the need for classification programs at the management level, based on the cost savings and the release of information in a timely manner consistent with the best interests of national defense.

My credentials for attempting this survey are of an academic nature. Although I have had some rather limited experience in the practical aspects of classification management, my real interest is in assigning a philosophy and theories to this complicated topic. It is my firm belief that, until a body of theory is accepted by the people in the classification management field, the application of techniques will be, at best, haphazard and incomplete.

One of the first problems was assigning a definition to classification management. Mr. Rushing has de-

scribed it "as the system for identifying and placing into its proper classification category, all information that requires protection in the interests of national defense." Alfred Dupell and Richard Buxton in the June 1966 issue of *Industrial Security* mention that there are as many definitions as there are users, and then proceed to offer this oversimplified description: ". . . DoD's securing the most security for its defense dollar and defense industry's getting the greatest dollar profit for its efforts, while continuing to protect defense secrets." Borrowing from general management theory and the two definitions cited, I offer this definition:

> Classification management: the application of sound management principles such as staffing, planning, organizing and controlling, to the activities of classifying, marking, regrading, declassifying, and destruction of information requiring protection in the interests of national defense.

Admittedly, this is a mouthful, but this definition permits us to rid the air of any taboos associated with classified materials. Thus, we are able to apply the same principles of management used in production, marketing, etc., to the management of classified inventories.

Once the definition had been decided on, the task of gathering information was initiated. Needless to say, very little has been published on this topic. After six months of persistent correspondence with members of the society, sufficient material was accumulated to form a background of classification management and identification of the major problem areas. Then, using the survey conducted by Mr. Rushing in 1963, the first draft of the questionnaire was formed. Copies were sent to Messrs. Fred Daigle and George MacClain, and to Mr. John Mackey, chairman of the Classification Management Committee of the American Society for Industrial Security. The comprehensive comments and suggestions of these individuals were incorporated into the final copy.

Materials supporting the information presented today have been gathered from all the known published sources dealing with the topic, extensive correspondence with classification management representatives, government representatives, and others interested in the subject, and from a few early returns of the questionnaire.

It is too early for presentation of any statistical truisms as respondents have been given until the first of August for completion of the questionnaire. However, I would like to acquaint you with the survey, and present the information that has already been gathered. Through this, it is hoped that the relevance of the survey will be understood and contractor cooperation will be insured. Also, the final results should be more meaningful to you once you understand the concepts and techniques used in the survey.

The questionnaire has seven sections which encompass the realm of activities in classification management. The first section is for general information — that is, the size of the facility, type of product or service, user agency, etc. It is with this information that I hope to correlate the

scope of classification management activities and the emphasis on classification programs with the size and nature of the facility.

Section II gets to the heart of the subject. Questions deal with the extent of the classification management function, who performs these activities, and where the classification function falls on the organizational charts. Thus far, my research has shown classification to be a part of the contracts office, administration, industrial security, and in larger companies, an office in itself. Most often, classification is a one-man show or the part time duty of someone in contracts or administration. There seems to be little uniformity in the placement of the classification management function. Size of the facility and the amount of classified contracts are relevant factors. As a side point, there are mixed reactions as to whether the security office function and classification function should be separated. Those favoring separation say that the classification function should *set* the standards while security is committed to *enforcing* them. Also, they state that classification is more related to contracts and administration. Proponents of a combined operation state that since both functions are charged with "protection," it is logical to work as a unit.

It is interesting to note that many classification programs just "began." No formal plan was adopted. Classification personnel learned by doing. To date, I have found but one training program in this field. This is understandable in light of the recent growth of classification management and the lack of uniformity of the programs in existence.

Section III is concerned with classification management personnel. The questions will attempt to raise support for professional recognition of a classification management career field. General management theorists claim that a good manager can manage any phase of an operation, but I say, "not so!" In this age of specialization, the man who is best does not only understand general management techniques, but he must thoroughly understand the technical phases of the operation. I cite the quest for engineers and scientists with MBA's as an example. The same thing holds true in classification as the body of technical knowledge grows at a fantastic rate. Witness the increased size of the new *Industrial Security Manual*, and your increasing inventories of classified materials. As new worlds of knowledge are opened, the amount that must be protected in the interests of national defense (and economic survival) seems to grow at a greater rate. However, more data will be necessary to substantiate any opinions.

The tangible benefits resulting from a good classification management program are the subject of Section IV. Preliminary research has revealed two specific references of substantial savings due to active classification management programs that are quite impressive. One program involved the destruction of over 10,000 documents in two years due to a vigorous inventory and analysis of existing classified documents. Concurrent with this, classified containers were reduced by one-fourth and

a continuing program has been adopted to constantly assess the classified materials for downgrading and destruction. Another example resulted in a cost savings in excess of $90,000 resulting from an orderly close-out of two classified contracts.

It is hoped that companies with good programs will offer more examples of reduced inventories. The type of program depends a great deal on the size of the facility, the emphasis placed on the flow of information, and the cost of handling classified material. One suggestion for program improvement has been mentioned many times. That is that it would be most desirable to have classification personnel attend contract negotiations along with the contracting officer and the user agency representatives. From this, the contractor would have some idea right from the start as to what is expected in the way of protection, safeguards, and classification measures. The feasibility of such a procedure has not been proven and it is hoped that the survey will shed more light on this matter.

Once classification guidance is received and put into effect, the emphasis is on document controls. A machine-based document control system was proposed by Mr. M. R. Powell in 1962. The use of electronic data processing techniques presents unlimited opportunities. Classification personnel have expressed great interest in EDP techniques. As computers become more generally available to small as well as large operations, machine-based document control possibilities will be expanded. But even in semi-automated and hand-controlled systems, sophisticated use of the document numbering method can be of great help. For example, a document control number of 66-A-98-C-149 could reference the year of origination, the office having direct control, the contract to which the document is related, an automatic time-phased downgrading notation and account number. I'm sure that many of you could come up with a dozen other ways to accomplish the same end. However, in actual practice, the use of such aids in document control procedures is the exception rather than the rule.

The last portion of Section IV asks about specific declassification programs. In one example, the plant security officer, over a period of two years, examined each document for applicability, and in cases where disposal was uncertain, a letter was sent to the originating agency for action. Through this, many documents were regraded and declassified. In another example, a firm demonstrated how this must work both ways. Actions regarding declassification or regrading were sent to all known users and a reply of action taken was mandatory. However, how about the users of derivative material? I'm sure that this is the position many of you find yourselves in as a part of your daily operations. The comprehensive review of classified inventories is a time consuming and costly process, but the review of classified materials has proven to be very fruitful in active programs. The measure used in assessing the value of inventory analysis can be the easier flow of information

or a specific dollar figure. The latter will be discussed next.

Cost studies are the subject of Section V. It was amazing to find that as cost oriented as companies appear to be today, very little has been done with the cost of establishing and maintaining classified controls. The Lockheed studies and those mentioned at the first seminar of the society are the only published works generally available. Individual estimates have ranged from 5 to 25 dollars per year for secret documents, and 25 cents to 5 dollars a year for confidential materials. Hopefully, other data will result from the survey, and some firms might be inclined to delve further in this area.

To be consistent, the costs in the survey were defined. Direct costs are considered as those of secretary processing, document control, mail and courier services, and recipient handling. Indirect costs are defined as those related to personnel clearances, security education, personnel costs of guards, industrial security, classification management, document control, and materials costs of manuals, locks, filing cabinets, safes, and records retention.

This is probably the most important aspect of the questionnaire, because if the real effect of eliminating 10,000 documents is to be realized, the cost of carrying the documents had they not been destroyed, must be known. Such information would perhaps stimulate smaller facilities to initiate classification management programs. Over a half-dozen facilities have reported that classification management programs had not been adopted or kept to a minimum because of the "overhead" involved in implementing such programs. The dollars and cents savings that could be proven would be a convincing argument for adopting a strong program. It is the net result that should be the governing factor.

Section VI is sure to evoke comment from all the respondents. This is the section dealing with DoD directives. The first, DoD Instruction 5210.47, is the document that establishes the basic requirements. However, many firms do not maintain a copy of this instruction, as it is only supplied on request. At any rate, comments on this document should correspond to those about the *Industrial Security Manual.* It is with the new ISM that controversy reigns. Recent articles in *Industrial Security, Security World,* and the proceedings of the industry-government meeting at Cameron Station in January point to a few specific paragraphs dealing with classification management that appear to have caused industry some alarm. One example is paragraph 11a which deals with paragraph marking. Unfortunately, I offer little support for the industry position. My own experience in writing operations orders and training plans demonstrates that the ability to extract classified material results in many benefits. The information requiring protection is easily identified. Unclassified abstracts of projects can be used in the day to day operations. This limits the need for document protection. However, it is hoped that the survey will be able to better pinpoint the matters of disagreement as some of the repercus-

sions are greater than they seem at first glance. One classification management representative states that contractors are cost oriented rather than information oriented and the emphasis is on documents rather than information concepts. A less specific comment on the ISM is that not enough importance is given to classification management — that perhaps a section dealing with this topic should be included. Generally, reception of the new manual has been good. I am sure that many more comments will be forthcoming.

Of the 35 classification management personnel with whom I have been in contact, every one that had any comment always included an opinion of DD Form 254. Comments ran the gamut of "vague" and "not specific enough" to "too little, too late." However, any critical comments were appended with suggestions for improvement. Generally, one of two recommendations was offered. Most often it was suggested that a detailed supplement be attached to give specific guidance. The other recommendation has already been discussed; that is, to have classification personnel sit in on contract negotiations to become acquainted with classification requirements. It was also mentioned often that a great deal of time is lost presently when requesting user agency clarification of classification problems. Others said that overclassifying was a major sin resulting from the vague nature of DD Form 254. The faults are not all one-sided. One representative mentioned that when classification personnel were allowed to take an active part from the start of a specific project much confusion had been eliminated. Also some contractors are guilty of being vague in subcontract classified guidance. More specifics will be generated as the survey does ask for improvements or perhaps a substitute measure.

The last section, Section VII is devoted to comments on items not covered formally in the questionnaire. One of the subjects most often brought up concerns the peculiar problems of research and development projects. With few exceptions, representatives from R&D facilities felt that special procedures should be adopted as production guidance did not apply easily to their operations. This included such things as classification of work sheets and notes, central control of personal notes, and the difficulty in protecting information that had not yet been assigned a classification or where the classification was unknown. This appears to be a valid problem area, and I hope to offer suggestions when the returns are tabulated.

Another item mentioned was one I personally experienced. There is not an established clearing house for procedural information in the classification area. However, the Defense Supply Agency is doing a great deal to alleviate this problem and of course, that is one of the objectives of the society.

A great deal of praise is given to the interest and participation on the part of the DoD Directorate of Classification Management. Project 60 and the more strict inspection procedures

were also cited as being beneficial to both government and industry.

A final item mentioned is that an increasing role must be taken by the society. The need for more frequent chapter meetings is cited to stimulate cross-talk between classification personnel. A central agency is needed where representatives can direct questions of technique or procedure, and from which answers can be requested from other members. This should result as membership increases and the members participate in all the programs available.

In summary, this has been a brief overview of what my research has netted to date. The returns should yield a great deal more factual information. I hope to show that in order to have an effective industrial security program, the "why" of protecting classified information must be determined first. To do this, the net benefits of implementing a classification management program must be greater than the costs of such a program. This should yield a monetary benefit along with the advantages of improved information handling techniques. Thus, with a proposed philosophy of classification management, techniques of adopting the program should follow in a more orderly fashion.

The final results of this survey will be made available to the society as soon as they are tabulated. Possibly, if the findings warrant, an article for the *Journal* will be the best means of disseminating the information. Collateral benefits will result to the NCMS library with the published materials that I have been able to locate.

I hope that this presentation has encouraged those who have received questionnaires to participate. If your company is not represented, and you wish to participate, I have a few questionnaires left. Any assistance you can give will be greatly appreciated.

At this time, if there are any questions I would be happy to try and answer them.

BOBERG: We thank you very much Captain Taylor. I am certain that we are all better off and able to get a better view of ourselves from those results that you have, and we are looking forward to the final results of your surveys.

QUESTION (name not given): Would it be possible to get a copy of your thesis?

TAYLOR: The AFIT reproduces 120 copies if I make it through. In that case, yes.

PANEL – GOVERNMENT CLASSIFICATION MANAGEMENT POLICIES AND PROGRAMS

BOBERG: Ladies and gentlemen, let me welcome you to the second day of our seminar. Today we have a panel session in the morning, another luncheon address, and a panel session this afternoon.

The moderator for this morning's panel is another friend of our society, Mr. Phil Schiedermayer. I think most of you gentlemen know Mr. Schiedermayer. If you don't, you should. He is Security Manager of Lawrence Radiation Laboratory, having held this position since 1952. He is a journalism graduate of the University of Minnesota. He is a life member of Sigma Delta Chi, which is the professional journalism society. His 1959 Lawrence Radiation Laboratory Status Report won the San Francisco Bay Area Science Writers Award for excellence. The prologue he wrote for the 1958 LRL Status Report, called "The Aim," is still used by the Laboratory to describe its role in physics research. He is a former special agent of the Federal Bureau of Investigation. He is presently — and we're very proud to have him here particularly on this basis — Western Regional Vice President of the American Society for Industrial Security, otherwise known as ASIS. Ladies and gentlemen, Mr. Phil Schiedermayer.

PHILIP L. SCHIEDERMAYER: Thanks you, Dick.

I have agreed to receive the questions that may come with respect to AEC programs. Our first panelist today is George MacClain, who is Director, Directorate for Classification Management, Department of Defense. He was born in Colorado, grew up in Washington State, did his college work at Whitman College, Walla Walla, and has a law degree from Harvard. He was in the Army during World War II and in the Judge Advocate General's Corps. He engaged in private law practice before World War II. From 1946 to 1952 he was with the Federal Communications Commission, including service as chief of several of the branches. He was later Assistant General Counsel in the National Security Resources Board. Between 1955 and 1963 he was Legal Advisor and Special Assistant to the Director of the Office of Industrial Personnel. He has been in his present position since March of 1963. He was admitted to practice before the U. S. Supreme Court, the U. S. Court of Military Appeals. He is a Phi Beta Kappa member, member of the Federal Bar Association, Judge Advocate Association, and Reserve Officers Club. George.

GEORGE MacCLAIN

The forum provided by this national seminar of the National Classification Management Society is ideal for carrying on a dialogue on the subject of government classification management policies and programs. This is true primarily because of the scope and breadth of the representation of the parties in interest which is here assembled. The common purpose here is to improve a working relationship insofar as it depends upon or is related to security classification of offi-

cial information. This purpose requires mutual understanding. Mutual understanding depends upon willing and effective communication.

As you know, the DoD began in 1963 to use the terms "classification management," and "classification management program." The policy behind these terms is that at any given time security classification as a protective device for official information shall match the current DoD needs for that protection. As necessary protection is the goal, the primary emphasis is and has to be to classify when necessary. The almost equal, but nevertheless secondary, purpose is, and has to be, to avoid unnecessary classification and to remove classification when the need for it has ended. A tertiary purpose, of course, is to control and manage the inventory of classified information.

The overall, common standard for security classification for all agencies, of course, is Executive Order 10501. In an ideal situation, two or more agencies applying this standard to identical information would arrive at the same conclusion with respect to whether that information should be classified, and if so, how, and for how long. But such perfect consistency between agencies does not always prevail, and even within the Department of Defense alone the views of two or more components are not in all cases the same. For a nation such as ours which must protect its sensitive information in the interests of national defense and at the same time wants to encourage the maximum possible free flow of information for advancement in science and technology, there is indeed a single, outstanding national goal toward which every agency and individual should seek to move. The DoD classification management program is dedicated above all to the achievement of this national goal, both within the DoD and as between the DoD and other government agencies with which it shares this responsibility.

In the context of the subject of this particular workshop, we must examine not so much the broadest aspects of policies and programs, but rather those aspects which undergird a realistic working environment from day to day or year to year. In this sense, the first policy and implementing program have to be and are, articulation and indoctrination in the theory of sound security classification. DoD Instruction 5210.47, published in December 1964, expresses this theory. Indoctrination has been taking place in the help we offer others in and out of Government in the daily operations of the Directorate for Classification Management; through the consultations and exhortations we pursue in jointly working out with DoD components their own regulations through which they reiterate the published DoD policy and proceed to make it work; and through the open exchanges of view we have with our colleagues in and out of Government in open meetings such as this.

As we see it, our theory of sound security classification must be framed around our legal authority to classify. Executive Order 10501 permits and requires classification of information when its unauthorized disclosure would be prejudicial or more serious-

ly harmful to the interests of national defense. But the Executive Order does not define the meaning of the term "interests of national defense." In our judgment, however, the Executive Order connotes very clearly that the term as used therein has a military ingredient and an international relations ingredient. We say, therefore, that classifiable information must be such as to provide a military or defense advantage over any foreign nation or a group of nations, or a favorable international posture among nations, or a defense posture capable of successfully resisting hostile or destructive action from any significant source.

We know that these expressions are in the nature of generalities and that sound security classification cannot depend upon generalities. Accordingly, we subdivide these terms analytically into seven separate sets of fact relationships and require security classification when the particular information involved matches one or more of these specific relationships.

Now possibly some might say that this articulation of theory is not new, that classifiers have used this approach since time immemorial. If so, our response would be that by reducing these concepts to black letter words and arranging them in a logical manner in a place of ready reference, we have advanced the state of the classification art and provided a usable tool for those who wish to play the game in good faith and make decisions with a sense of strength in the rightness thereof.

Knowledgeable classifiers know that it is not sufficient simply to identify precisely the particular way in which the information involved would provide a national defense benefit or advantage. Before it can be concluded that there is a real benefit or advantage, two additional factors have to be brought into play. One of these is the United States domestic state-of-the-art, and the other is the state-of-the-art in other nations.

In speaking generally of the state-of-the-art, I distinguish between what already is publicly known and understood, and how the state-of-the-art would be advanced because of the information that is being considered for security classification. From the standpoint of the publicly known state-of-the-art, I include, of course, both the U. S. domestic public and the public of other nations.

Generally, what the public already knows is beyond the reach of useful security classification. However, when we have exhausted the publicly known state-of-the-art, we then depend upon U. S. intelligence research and reporting in order to reach an evaluation of the not yet publicly known state-of-the-art in foreign countries. There are times, of course, when technical intelligence does not have all the answers. A useful rule for general application in such a case is that, if it cannot be determined whether or not a U. S. advancement in the state-of-the-art is known by foreign countries, assume it is not and lean in the direction of security classification.

We recognize, of course, that the product of technical intelligence that is available to government classifiers generally is not available outside the

government. However, that is really not a handicap to classifiers outside the government because they do not make original classification determinations; instead they make derivative classifications based on guidance they receive from the government.

The foregoing comments directed toward the factual relationships that must be found to support security classification, and the interrelationship between those factual relationships and the state-of-the-art, are of importance primarily to the classifiers within the government community. This is not to say, however, that classifiers in industry are not in a position to provide assistance to the government from the standpoint of the state-of-the-art as well as from the standpoint of the aforementioned factual relationships. As a matter of fact, we recognize the capability of the defense industry community to provide tremendous help to government classifiers, because so often those in industry have knowledge about the state-of-the-art, both present and anticipated, that may be beyond the knowledge of those officials within the government.

Original security classification, which finds expression in classification guides and in DD Forms 254 is, of course, the starting point for all security classification everywhere. Not only is it essential within the government that original classifiers have the knowledge and the know-how to make good classification determinations reducible to guidance; it is equally important that original classifiers within the government make classification determinations that are not in conflict one with another. In this connection, the Directorate for Classification Management serves as a central clearing house for accomplishing the resolution of classification inconsistencies and conflicts that are found or float to the surface. Sometimes, of course, these conflicts and inconsistencies become deeply imbedded in operations before they are noticed. At other times, however, possible problems can be anticipated and avoided. Protective action of this kind especially applies where two or more components of the DoD are interested in the same area of research or development at the same time. In this kind of case, the Directorate for Classification Management has responsibility to institute a coordinated project to develop a DoD security classification guide that, when published, is mandatory for the entire DoD and prevents conflicts that otherwise might arise.

In the area of classification guidance, there is no subject more dear to the heart of everyone than the DD Form 254. The improvements in the DD Form 254 which were accomplished several years ago have not resulted in a completely practical system. In our opinion, the defects of the current DD Form 254 are attributable to several factors. One factor is the format of the form in which there is set forth a relatively long, but nevertheless limited, list of topics to serve as a check list for security classification guidance. Another factor is the inadequacy of the preparation of the DD Form 254 because of the varying degrees of security classification ex-

pertise possessed by those who prepare the DD Forms 254.

At the present time, the Directorate for Classification Management is issuing for comment a set of documents which constitute a possible concept for revising the DD Form 254. Copies are being made available to industry organizations, to the Office of Industrial Security, CAS, and to DoD user agencies. September 1 is the target date for the receipt of these comments, shortly after which we hope to be able to reach some fairly firm conclusions on the direction we should take.

In general, our approach at this time is to have a DD Form 254 sufficiently adequate and flexible that it will eliminate any need for a DD Form 254-1, or a "Letter in Lieu of." The DD Form 254 that we envisage will provide guidance in narrative form. This kind of guidance would identify specifically the information requiring security classification, and would do so in such a manner that those depending upon the DD Form 254 would be able, without too much difficulty, to translate the guidance to the requirements and practicalities of the particular contract involved.

A fundamental concept in security classification management is that the responsibility for providing security classification guidance to industry rests upon the DoD user agency whose contract is to be performed. So far as I know, there is general agreement on this principle. In view of the fact that the Defense Contract Administrative Services administers all aspects of defense contracts after they have been entered into, we have collaborated closely with the Office of Industrial Security, CAS, of which Colonel Jim Cogswell is the Director. Colonel Cogswell and his staff have worked extremely closely with us in connection with the revision of the DoD Industrial Security Manual and DoD Industrial Security Regulation.

Many of you already are in receipt of the revised Industrial Security Manual, published under date of July 1, 1966. As you examine that document, and as those of you within the government later examine the revised Industrial Security Regulation when it is published, you will find running all through each document the concept of the responsibility of the user agency for security classification guidance.

There are many situations where the purchasing contracting officer of the user agency will be called upon to assist in matters of security classification guidance, and there will be many situations in which the administrative contracting officer of the DCSR organization will be called upon to provide assistance in this area. The sharp distinction that is so important and is to be borne in mind at all times is that the Administrative Contracting Officer will be the eyes and ears to detect security classification problems within industry and to bring these problems to the attention of the user agency representative so that the user agency may resolve the problems.

In the foregoing connection, of course, we recognize that the Purchasing Contracting Officer of the user agency ordinarily is not expected to be a security classification expert. The security classification expertise of

the user agency is expected to be found in the program or project office of the user agency. That is the office where original classification determinations for programs and projects are made and security classification guidance originally is written. The obvious task to be shared by both industry and government is to develop and maintain a smooth operating procedure whereby the user agency program and project office will provide the guidance that is needed, at the right time, in the right form, so that if the contractor receiving this guidance has problems with it, he will be able, without difficulty or delay, to obtain from the user agency the guidance that he needs. We do not have the slightest doubt that under the effective leadership of Colonel Cogswell and the classification management leadership within the user agencies, we shall have a good, reliable DD Form 254 relationship and operation.

Even a relatively brief discussion of classification guidance would not be complete without making reference to the established Department of Defense paragraph marking requirement. The DoD policy is that where a document several paragraphs in length contains classified information, and the security classification of the various paragraphs is not uniformly the same throughout the document, the security classification of each paragraph shall be marked on the document, or else, as a second choice, explicit security classification guidance shall be included within the document or as an appendix to the document.

There is absolutely no doubt in my mind that this paragraph marking requirement serves an extremely useful purpose. First of all, the requirement sharpens the classification determinations made by the originator of the document. Further, the paragraph markings serve as very precise classification guidance for all persons who come into custody of the document after the originator.

The foregoing DoD paragraph marking requirement is reflected in the revised Industrial Security Manual published under date of July 1, 1966. Accordingly, the requirement is applicable to industry in the manner stated in the Industrial Security Manual. The requirement is that documents originated within industry shall be paragraph marked if those documents are to be transmitted outside the facility where they are created. As further stated in the Industrial Security Manual, there is a time schedule for the application of this requirement. We very much hope that industry will find the paragraph marking requirement not only an acceptable device, but a very popular one as well. Experience has indicated to us that a conscientious attempt to use the paragraph marking device is not as time consuming or difficult as the uninitiated seem to think. It sharpens the whole business of security classification and serves to simplify the burdens of all involved, both at the point of beginning and at all later times.

There are two more points I wish to mention before closing. One of them concerns a relatively recent effort on the part of AEC-NASA-DoD

to formulate mutually agreeable security classification standards and criteria to govern security classification by each of the agencies in the area of nuclear space power and propulsion. This effort is an extremely healthy one. It is progressing nicely and is expected to serve very well the interests of all three agencies and their respective contractors.

My final topic concerns a money saving project carried out by the DoD in two increments, one in the fall of 1965, and the other in the early part of 1966. It is a precept of classification management that sound classification management will save money. We think the largest possible savings will accrue from correct security classification determinations in the first instance. The costs incident to correct classification are inescapable, and must be paid. It is the costs of incorrect classification or of bad classification management that are avoidable.

The Directorate for Classification Management wanted to obtain some hard data on the costs of handling classified documents in transit and on the costs of conducting inventories of top secret documents. To this end, we conducted some investigations within the Department of Defense. It was learned that in making an inventory of top secret documents, the average unit cost per document was 28 cents. With this cost determined, the Office of the Secretary of Defense carried out a project during one month in the fall of 1965 to review and thereby try to reduce the number of top secret documents in current inventory. This exercise was very successful, and, therefore it was expanded to include the remainder of the Department of Defense. In a three-month period during January to March 1966 there was a reduction of active top secret holdings in current inventory by approximately 34 per cent. This reduction was accomplished by downgrading, declassification, destruction, and retirement to a storage area. Approximately 94 per cent of the reduction resulted from destruction of unneeded copies. As a result of this project, cost avoidance savings in an estimated amount of $124,000 for the 12 months beginning April 1966 will be realized. Not only did this project result in appreciable cost avoidance savings, it also lessened the risk of possible compromise of highly sensitive information, and it is reported to have caused participating activities to take a more deliberate interest in keeping the number of top secret documents in current inventory to the minimum consistent with operating requirements.

The foregoing remarks cover only some of the many aspects of the Classification Management policies and programs of the Department of Defense. There is much more that could be said if there were time. I hope that in the ensuing question period you will feel free to ask questions on any subject you wish, whether or not I touched upon that subject in my formal remarks. Thank you very much for your attention.

SCHIEDERMAYER: Our next panelist is Frank May, representing the Air Force. Francis W. May is Chief of the Classification Management Branch of the Directorate of Security and Law Enforcement of the

Air Force. He is a graduate of the Columbus School of Law at Catholic University. He served in the Air Force during World War II and in 1946 he returned to civilian employment after he had been on the staff of the Judge Advocate Office. In 1951, while he was working as a legal assistant in the Bureau of Customs, he was recalled to active duty with the O.S.I. He returned to civilian life in 1953, although staying with the Air Force since that time. Since then, he has been in various policy positions with the Headquarters of the Air Force. He remained in the reserves and has been a Colonel since 1955. Speaking on the Air Force Classification Management Program, Mr. May.

FRANCIS W. MAY

Today is practically the third anniversary of the Air Force Classified Management Program. On 9 July 1963, the Air Force published AFR 205-24. That regulation, which has not been changed, states our objectives and assigns responsibilities throughout the Air Force. But before publication, the Air Force had to decide which of two broad philosophies of management it would follow. Under the conditions that prevailed when the DoD classification management program was established, the Air Force could have relied on an essentially passive role — a judicial role, so to speak. In this attitude we at headquarters, under our broad security policy responsibility, would make decisions only when required to do so, and respond to recommendations referred to headquarters. In other words — sit back and wait for others to take the initiative and then react. The other choice was to have headquarters engage in an active role, providing aggressive leadership, questioning, suggesting, probing, proposing objectives, and stimulating progress. I am happy to say that the Air Force decided to take the active management role.

Consequently, those of us in the Air Force Classification Management Program at headquarters are concerned with planning, organizing, coordinating, directing, and controlling activities that will accomplish the objectives of the program as established by AFR 205-24. These objectives can be summarized as: providing central management, insuring the proper security classification of Air Force information, and insuring prompt downgrading or declassification when appropriate.

I am pleased to have the opportunity to talk about our program today because I believe that the Air Force has made real progress and is now beginning to reap benefits. We no longer are crawling on our hands and knees. We are now on our feet and moving ahead. I hope, also, that you can individually benefit from our experience and take with you one or two ideas that will assist you in the furtherance of your own program, whether it be military or industry oriented. Also, most of you work closely with the Air Force on classified programs or projects and it should benefit us if you understand our organization.

When the decision was made to take the active management role, there was a need to pinpoint responsibility and establish the means

to accomplish active management. The Director of Security and Law Enforcement, under the inspector general at headquarters, was assigned responsibility for the Air Force classification management program. His responsibility includes: the establishment of criteria and standards for identifying information to be classified and determining the proper degree of protection; the establishment of procedures to assure the proper application of the criteria and standards; requirements for security classification guidance; security classification authority control; security classification review procedures; and evaluation of the effectiveness of the program. To carry out such responsibilities, the director established a Classification Management Branch within the Security Policy Division Moreover, under the provisions of AFR 205-24 the commander of each major air command and equivalent organization was directed to designate an activity at Command Headquarters level to implement and maintain an effective CM program. Although we did not specify that the major air command responsibility be assumed by security and law enforcement activities, in most of the commands that is the way it worked out.

Exceptions do exist, however, and there are commands where the CM program is being supervised by either administrative services or operations. The assumption of the responsibility below the major Air Command level has for the most part been in accordance with the desires and needs of the particular command. From an organizational standpoint the Air Force CM program is set up in accordance with the "chain of command."

This organization was selected as being the most appropriate to accomplish the purpose of security classification management—the organization and employment of human and material resources to provide for the protection of sensitive information only to the degree necessary in the interest of national security. Accordingly, we have defined security classification management as: the development and implementation of policies and procedures that will ensure, first, the assignment of appropriate security classification to official information requiring protection, and second, the continuous review of classified information to effect timely regrading and declassification actions as warranted by changing conditions.

Th Air Force policies and procedures that laid the foundation upon which the program has been built were developed in consideration of the operational approach to management. This operational approach rests on the premise that the end product or goal to be achieved—protection of sensitive information only to the degree required in light of ever changing conditions—is the paramount consideration in developing policy and procedures and directing operations. Accordingly, our management actions have been geared to the situations rather than oriented toward ideal patterns which may or may not fit. It further presupposes that each problem or situation has some elements that are unique and that each, therefore, must be evaluated in its own setting, which we all realize is

ever changing under the impact of technological advances and operational circumstances. This approach in itself rejects the possibility of developing policy and procedures that fall into neat patterns of solving problems. In fact, we are the first to admit that this dynamic approach is often quite messy. The odds and ends stick out. But it helps us to see our problems as they really are. Accordingly, the current Air Force CM policies and procedures are a result of a realistic evaluation of the specific situation.

Let us look briefly at our basic policy. Only information is classified. Equipment, drawings, reports, models, etc., all media that convey information must be marked in accordance with the security classification of the information revealed. This basic policy causes us to carefully examine the hardware, report, plan, etc., to identify the sensitive information that could be revealed by the item if we are to assign a valid security classification. Too often material is marked classified without identifying the specific information that is to be protected. I am sure that you immediately recognize the source of our requirement for paragraph marking. A corollary to this basic policy is the fact that classified information can be the result of putting together bits and pieces of unclassified information. We have recognized this as a basic policy and realize that where many of you are concerned technological reports are often made up of "bits and pieces" of unclassified information, but when considered in their entirety could conceivably reveal very sensitive information. An explanatory statement to that effect, identifying the sensitive information, is all that is required.

A second policy basic to an effective CM program is that during the development, preparation and handling of a document or an item of hardware there must be no interval during which classified information is left unprotected. The intention or belief that an item revealing sensitive information will be seen only by personnel authorized to have access does not justify the absence of adequate security classification markings. Proceeding on the assumption that information will be safe, although not marked for protection is foolishly assuming that none of a large number of compromising events will occur. The necessity for protection should be made readily apparent to anyone having access to the material whether it be in the form of rough draft or working papers or hardware or mockups. Also, the re-assignment or transfer of a classified project or program, whether it is in the realm of research, development, construction or engineering, by one unit to another must include identification of classified information.

Our third basic policy demands a consideration of overclassification as secured against underclassification. We recognize that inherent in any classification determination, and in any subsequent classification review, is the requirement that the classifying official must weigh the damage to the national defense that might result from the release of the information, against the detrimental effect upon the national defense that will defi-

nitely result from the costs and impediments inherent in a decision to classify. While underclassification may result in less than adequate protection, overclassification causes a waste of resources and needlessly impedes the conduct of normal operations. Accordingly, our policy requires that technical information be carefully evaluated to identify those elements that require security protection to insure effective use of equipment in operational situations. When such information, if placed in the public domain, would diminish our technological lead time or provide another nation with an advantage, it should be seriously considered for classification.

Another basic policy is that the assignment of a security classification is a responsibility of command. The project command originating the information has the responsibility for determining if the information needs to be classified and the degree of protection required. We believe, however, that it is most unusual for a single individual to be knowledgeable about all facets of the program or project. Accordingly, we have adopted the policy of a team concept to classifying. The technical, operational, and security people working together have a much better chance to arrive at appropriate classification determinations than any one segment working alone. This concept is practical and proven to be most effective. For some programs the contractor personnel have been valuable additions to the team and we in the Air Force certainly encourage their participation.

Within the framework of our basic policies and procedures, we have given a great deal of attention and thought as to how best achieve classification consistency. This is no small chore but in the area of research and development we have made progress. Some of the improvement in these areas has naturally benefited other fields. For one thing, we have established a standard format for security classification guides. This approach towards uniformity has been of great assistance in getting meaningful guidance from our weaker program offices. Just recently the Air Force Systems Command has taken positive action to implement our desire at headquarters to provide contractors with guides via the use of the DD 254-1, Security Classification Specification for contracts, instead of the DD 254, Security Requirements Check List, which is in most instances too ambiguous to be of assistance to the contractor. Moreover, we believe that because of the change the prime contractors will be in a better position to furnish subcontractors with better security classification guidance.

The Air Force Systems Command has also directed that all programs being managed in accordance with the 375 series of Air Force Regulations will have a security classification guide, as detailed as possible, included as a part of the program planning documentation. In addition to establishing early classification consistency this action should benefit contractors in that they will be able to better evaluate security requirements at the proposal stage.

You can readily see that Air Force

policies and procedures are aimed at improving communications between the classifier and the user. Detailed and meaningful guidance is the answer to improved security classifications and classification consistency. However, policies and procedures alone will not do the job. The guidance must reflect consideration of all the facets, not just one plane of the surface. Accordingly, we are constantly trying to get the idea of team concept or working group approach across so all factors — technical development as well as operational situations — will be considered in the classification determination.

Looking at our progress during these past three years we believe that by adopting an operational approach to classification management we have been able to develop practical and workable policies and procedures as the foundation for an effective classification management program.

I certainly hope that some of the ideas or thoughts I have presented, although by no means new to the management field, will provoke some action and assist you in your own programs. I believe the Air Force has made great strides over the past few years. There are still many things remaining to be done, but with the help of the other military departments and industry and the NCMS, I am sure that CM in the Air Force will continue to move ahead.

In closing I must say that we should keep in mind that effective security classification management is largely the application of good judgment, reflecting a combination of intelligence, experience and understanding. Yet there are other basic ingredients. We must have the conviction that the job is worth doing and show enthusiasm for doing it. These are not matters that can be put on a chart or stated in policies, procedures or rules. There are no shortcuts to a good security CM performance. The route involves circumspection, good judgment, hard work and determination.

SCHIEDERMAYER: Thank you Frank May. Commander Poenicke, our next speaker, entered the Navy in 1942 while attending Brooklyn College and was commissioned and designated a Naval Aviator in 1944. He then performed normal aviation assignments until 1954 when he became a straight sea-going sailor and served on board cruisers, destroyers and other ships. He reported to the staff of the Chief of Naval Material in 1963 from command of the USS "Greene" DDR 711. Commander Poenicke is presently head of the Security Branch of Headquarters, Naval Material Command. Commander Poenicke.

CHARLES F. POENICKE, JR.

I wish to express the appreciation of the Chief of Naval Material for the opportunity to give you first hand knowledge of the new Naval Material Command classification management program. I want to emphasize that my remarks concern only the Naval Material Command, that is, the Headquarters, Naval Material Command, the six systems commands, and the project managers directly under the Chief of Naval Material.

A classification section has been established in Headquarters, Naval

Material Command, under the Deputy Chief of Naval Material for Procurement. This section is in the Security Branch of the Contract Administration Division.

The Classification Management Section ha the responsibility to establish policies, procedures, systems and techniques necessary to meet the requirements of the Navy classification management program within the Naval Material Command. Additionally, the Classification Management Section will supervise and review the programs of the activities of the Naval Material Command to insure compliance with overall Navy program objectives. I should mention here that the overall Navy classification management program is established by the Chief of Naval Operations.

In fulfilling the responsibilities I just mentioned, the following tasks will be performed by the new Classification Management Section:

First, it will prescribe procedures for use by the Naval Material Command to insure: timely promulgation of classification plans and guides required for each classified plan, program, project or procurement; that updated classification guidance is available; uniform application of the automatic-time-phased downgrading and declassification system; uniform interpretation of security classification policy promulgated by the Chief of Naval Operations or higher authority.

Second, monitor and review, as feasible, the classification guidance issued for classified plans, programs, projects, or procurements.

Third, assist the systems commanders and project managers, as practicable, in preparing classification guidance.

Fourth, counsel and furnish technical guidance to the systems commanders and project managers.

Fifth, maintain staff surveillance over the classification management organizations of all subordinate activities.

Sixth, visit contractor facilities, as practicable, to determine if furnished classification guidance realistically meets overall program objectives.

Seventh, coordinate and resolve differences in classification management matters arising within the NMC.

Eighth, coordinate security classification matters with the Deputy Chiefs of Naval Operations or the Chief of Naval Operations as appropriate.

And lastly, maintain a library of scientific and technical intelligence reports, studies, etc.

Resources have been allotted to execute this program and an experience factor will determine what else is required. The s stems commanders and the Chief of Naval Material project managers have been advised to insure that they have supporting organizations within their own activities directly responsible for the classification management function.

This concludes my prepared remarks. Thank you.

[*Howard Maines presented the paper that was to have been presented by Admiral Walter F. Boone, USN Retired, Assistant Administrator for Defense Affairs, National Aeronautics and Space Administration.*]

SCHIEDERMAYER: Howard

Maines is well known to most of us who have been in and around ASIS meetings. He is a native of Fort Worth, Texas. His birthdate is listed here. It's after mine, so I won't mention it. Howard served three years in the Navy in the Pacific during World War II. He was graduated from Texas Christian University in 1950, and did a couple of years of graduate work there following his graduation. He was with the Investigative Section of the Civil Service Commission from 1952 to 1955 and was in the Bureau of Aeronautics until 1958 in Classification Management. From 1958 on he has been with NASA. He is the Chief of the Security Classification Management and Industrial Security Branch. At NASA he is presently the Executive Secretary of NASA's Classification Board. Speaking on the classification management program in NASA — Howard Maines.

HOWARD G. MAINES

The National Aeronautics and Space Administration specializes in solving different problems. One of the most exacting problems facing NASA management is that of carrying out its mandate to conduct an open program of space activities for the benefit of all mankind—a program for all the world to see and understand—while at the same time withholding from the public domain that information the unauthorized disclosure of which would have an adverse effect on the national security. This problem is made particularly difficult by the fact that much of the new technology being developed by NASA has some foreseeable application to national defense.

In establishing the administrative machinery in 1958 for a civilian space program, the Congress called for an open technology. It required NASA to provide for the "widest practicable and appropriate dissemination of information concerning its activities and the results thereof." At the same time, the Congress provided for the withholding from public inspection of that information classified to protect the national security. In stipulating this important exception to the basic philosophy, Congress recognized that there are practical limits to the maintenance of an open technology.

There are practical limits within which NASA must operate. We must conduct our activities in harmony with the work of other agencies in the Executive Branch of the Government. The release of information classified in the interest of national security is an area in which we are not free to act unilaterally. NASA is not represented on the National Security Council. It is not entirely privy to the many and delicate considerations that underlie the system of security classifications surrounding the conduct of our national defense and foreign policies. The relationship of our classification practices to the struggle by our open society against the closed circuit of the Communist countries, and their avowed purpose to dominate the world, is not a matter to be determined by NASA independently.

However, from our dealings with other federal agencies, we do have a workable knowledge of the areas that agencies within the Executive Branch of the Government consider to be sensitive. NASA, acting on its own, must

classify certain categories of data and material in accordance with that knowledge. But with only limited requirements for, and access to, classified information about day-to-day developments in the nation's world-wide diplomatic and defense activities, NASA cannot substitute his own judgment for that of the Department of Defense, the Department of State, or other agencies of the Government in the field of information security.

What our nation is experiencing today, and has been experiencing in the last quarter of a century, is a scientific and technological revolution. Cooperative effort on the part of the Government, industry, our universities, and the scientific community, has been the prime mover in this revolution.

Without such teamwork and cooperation, our nation could not have developed the immense technological power that it now possesses—the technological power that makes possible supersonic aircraft, ballistic missiles, nuclear and thermonuclear weapons, and many other elements of our national defense posture and our national economic strength. This cooperation has given us tremendous capability for technological research and development, now being extended and augmented for space exploration, which will be available to meet the national security and economic requirements of the future.

Much of our basic research, although not in areas specifically related to weapons programs, has led to later applications that have helped to strengthen our defense posture. The fields of cybernetics, cryogenics, solid-state physics, and micro-miniaturization are examples that come immediately to mind.

The influence of our technological progress is, and has been, a prime factor in keeping the peace. Technological and scientific capabilities constitute a basic source of national power. Preeminence in the field is an important instrument of diplomacy which gives us leverage in our dealings with other nations involving peace and freedom in the world. Our manifest ability to react quickly and effectively to any new development threatening our national well-being is a strong deterrent to aggression.

We can neither wish away nor afford to ignore political realities that make the capability to conduct varied operations in space a matter of strategic importance as well as a means to satisfy man's scientific curiosity and advance his knowledge of the universe. We can no more afford to falter in space than we can in any earthly pursuit in which the security and future of our nation and the free world hang in the balance.

The space effort is really a research and development competition — a competition for technological preeminence, which creates and demands the quest for excellence. In this quest, the space program is increasing our scientific and technological power—a resource as important as raw materials and productive capacity. Should we fall behind in the area of space technology, we would jeopardize our ability to move ahead on earth as well as in space. At stake is the technological balance of power in the world.

In space we are using science and

technology to build our national competence and to work toward a peaceful and better world. We believe that the reinforcement of this new foundation of power, based on advanced technology, can provide new means of meeting man's needs for security, freedom, dignity, and opportunity.

Prestige is meaningful only to the extent that it reflects the substance, not the shadow, of power. Thus, the value of the space effort must be judged in terms of how well it provides a visible focus of power, evident to all the world, and manifests a broad capability to do whatever is necessary to insure the security of the nation and to contribute to the peace of the world.

These are some of the imperatives that motivate us to explore and utilize the new medium of space.

Thus far I have been discussing the importance of national technological power in an era of scientific and technological revolution, and some of the applications and implications of that power. It is clear that science and technology are becoming major forces in all aspects of human activity. Our national security, our ability to lead the free world and preserve the peace, and our future economic growth, are all bound up in the efforts that we expend to excel in the acquisition of new scientific knowledge and the development of new technology.

But to return more directly to our subject—why is it necessary for NASA to impose some degree of protection on certain of its new technological developments in order to maintain and exploit our technological preeminence? The justification in four general areas might be worth mentioning as being illustrative.

First, wherever a new material, device, manufacturing process, or operational procedure can be applied to give us a military advantage, it is certainly in the national interest to protect that advantage for as long as we can. In this, we follow the lead of the Department of Defense.

Such determinations are not always clear cut. In some cases it will be necessary to weigh the advantages to overall national power of a wider dissemination of a new development against the disadvantages of its restriction.

We cannot hope to maintain the secrecy of such developments indefinitely. The best we can expect is to keep ahead of potential adversaries by a lead-time interval of several years.

Some will say that it is impossible to protect a technological secret anyway—that if an unfriendly government wants the information badly enough it can eventually obtain it through intelligence nets. Perhaps so, in many cases. But we shouldn't hand it to the other fellow on a silver platter. Let him pay a price for it in expended resources of men and money. He will have that much less to spend on weapon systems.

Second, we want to maintain an industrial lead over our competitors in the world market. Only by producing superior products at competitive prices can we sell enough goods abroad to balance the outflow of gold required to support our economic and military commitments around the world.

Here again it is a matter of judgment—of weighing trade-offs—as to whether we strengthen our industrial position by an unlimited dissemination of new technological developments or by withholding under a controlled dissemination those selected technologies that provide the answers to key problems in our commercial productivity.

Take the supersonic transport, for example. Here we are in direct commercial competition with the European consortium and the Soviet Union for a potential world market that will run into billions of dollars per year. NASA is working on a number of developments which will probably represent the difference between a Mach 2.0 and a Mach 2.7 aircraft. Should we tell our competitors all we learn about new metals and lubricants required to produce and economically operate the higher performance engines, about welding the newer alloys needed to withstand the higher skin temperatures, about sealing fuel tanks to hold up under the more rigorous operating environment, etc.? I would think not.

Third, in the less obvious and perhaps intangible political area, the classification and controlled disclosure of some of our most advanced technologies provides our government with a valuable instrument of diplomacy, some added bargaining power, if you will, something to offer as an incentive for other governments to join with us in cooperative efforts that would serve to advance the understanding among the nations of the Free World and to strengthen our alliances.

Finally, we classify certain operational information pertaining to the command and control of space vehicles where the possession of the information would facilitate malicious interference with a space mission.

In compliance with Executive Order 10501, NASA, along with some 30 other federal agencies, classifies certain types of "official information" in the interests of "national defense." We interpret "national defense" in a broad sense to encompass not only considerations of military defense but also economic and political factors having bearing on the national defense posture. While the NASA aerospace program is peaceful in purpose and practice, certain of the scientific, technological, and operational developments and activities of the program have a direct bearing on national defense. In the economic sector, the cutting edge of international competition is advanced research and technology. To fall behind in this area would be to lose power in world markets, and this in turn would lead to a decrease in power for defense. As I have pointed out, preeminence in the aerospace field is an invaluable asset in international relations, a visible focus of our ability to do whatever is necessary to insure the security and well-being of the nation.

Protection of selected NASA information through security classification is not inconsistent with the space act requirement to "provide for the widest practicable and appropriate dissemination" of NASA information. The uncontrolled dissemination of information the disclosure of which would be contrary to the interests of

national defense clearly would not be "practicable and appropriate." Generally speaking, one might say that we should reveal the "what" and "when" of our programs, but not in all cases the "how."

Classification does not deny information to those who have a need to know. It does not completely restrict the release of information. It simply results in information being disseminated on a controlled rather than an uncontrolled basis. In this connection, I understand that there are something over 23,000 U. S. industrial firms cleared to receive classified information where there is a bona fide need to know.

In general, the types of NASA-generated information required to be protected in the interests of national defense lie in the areas of applied research and technology and operations. The closer the approach to an application of a new technology, the more likely the need for classification. Ordinarily, basic scientific research (i.e., the phenomena of nature) do not require classification. For example, there is very little classified information in such programs as Tiros, Nimbus, Relay, Echo, etc. Conversely, there is considerable classified technology in such programs as Gemini, Apollo, Rover, etc. These last-named programs are developing large quantities of applied technical data.

We have recently published a handbook that sets forth the legal basis and philosophy underlying our classification program, and cites some specific criteria and guidelines as an aid to the responsible NASA officials in determining appropriate security classification assignments. In the final analysis, however, the matter of classification boils down to an exercise in enlightened good judgment.

About a year ago, NASA's top management established a Security Classification Board. Each of the major program and staff offices is represented on the Board, and the individuals selected are of such stature that they can speak authoritatively. We have been fortunate in having high caliber individuals on the Board. In the ten months since the creation of the Board, we have convened it several times. Although we do not always find a unanimous opinion, we have been able to resolve most of our differences without too much controversy. The Board members have additional assigned functions within the security classification management program other than membership on the Board. They also serve as security classification officers within their respective organizational elements. In this capacity, they are responsible for the coordination of proposed classification assignments within their respective offices, interpreting security classification guides in their respective fields of interest, coordinating the security classification reviews of technical information under their cognizance and serving as channels for questions or suggestions concerning security classification policies or guides.

We are pleased with the results of our Classification Board. I feel that it has made a major contribution to the NASA security classification management program. The new NASA handbook to which I referred con-

tains classification criteria and guidelines formulated by the Board in response to the NASA classification policy enunciated by the Administrator. We plan to review this document in about six months. Panel discussions such as this will help us to assess the validity and usefulness of this document.

SCHIEDERMAYER: Our next speaker is Joe Sullivan, Chief, Office of Industrial Security, Defense Contract Administration Services Region in Los Angeles. He is a native of Boston. He attended Northeastern University, majoring in Industrial Relations. Since his discharge from the Army after World War II, he has been in Government procurement, contract administration, labor relations, production, and industrial security. As Chief of the DCASR Office of Industrial Security, he directs the DoD Industrial Security program throughout Southern California, Arizona and Nevada. Approximately three thousand contractor facilities are under the security cognizance of DCASR of L.A., which has often been referred to as the largest "security cog" office in the United States. Speaking on the role of the cognizant security office in classification management, Mr. Sullivan.

JOSEPH C. SULLIVAN

The speakers on this panel who have preceded me have covered classification management policy and how the program works at a user agency level. I would like to address myself to how we at the local cognizant security office get involved in this program, and what we feel is our role in this dynamic area.

When the results of the Project 60 study were evaluated it became apparent that contract administration services of the three military departments should be consolidated and a centrally directed Industrial Security program be established.

For the past six months our cognizant office here in Los Angeles has been experimenting in the security classification area. We have been watching the progress of our classification specialist with great expectation for we feel sure that his services will pay great dividends in the days ahead. It has already become obvious that there are great cost saving possibilities in maintaining a constant review of all DD 254's that flow into industry from the various user agencies. During the past six-month period we have reviewed over 5,000 254's. Our classification specialist must examine the security requirements to assure that classification specifications identify and describe the classified information involved in the contract because it is most important to us that the contractor is able to apply the necessary protective measures without undue operational restriction. Our specialist has been challenging any 254 that contained unrealistic or questionable requirements, and we have been successful in getting the project office to make changes resulting in more meaningful security requirements.

Our classification review also allows us to determine if the classification requirements of like contracts, awarded by different sources, are consistent.

Frequently we find it necessary to point out inconsistencies to various contracting activities, who eventually get together and agree on a common classification.

We must also review the 254 to make sure it reflects sufficient guidance for the contractor to determine at which stage of development or production the material or documents require classification. As an example, our specialist reviewed a 254 concerning a Navy production contract with a firm in the Los Angeles area. The item to be produced was a fuse for a missile to be used in the Southeast Asia theater. The DD 254 indicated that the end item, the military application, numbers contracted, production, and program schedule, rate of delivery, numbers delivered, and unit cost information were considered classified. In addition, the reliability of not only the end item but the components thereof were considered classified information. It was apparent that the only reliability information that should be considered sensitive was that which revealed whether the end item performed its function in service use. A meeting was held at our office with the company technical people, along with the Navy project and contracting people, and it was finally decided to declassify all production information. In fact when the new DD 254 was issued to the contractor it permitted all shipments of the end item to be unclassified. These declassification actions resulted in cost savings and eased a situation that would have caused serious production delays. The cognizant office in this case served as a catalyst in bringing together the proper parties who were able to grant the contractor relief from unnecessary classification.

We have become active in participating in post-award conferences where on many occasions our presence has paid dividends in areas of cost avoidance. We are mindful of our goal, which simply stated is: "security classification guidance to the contractor must be meaningful." If the 254 is ambiguous we feel that we must move out and get it corrected to everyone's satisfaction.

In another case, a major contractor here in Southern California had been furnished a DD 254 that indicated the end item to be produced on the contract was top secret. It also indicated external configuration or view of the item was top secret.

The item (a typical black-box situation) was of such a size that it could easily be afforded proper storage when not in use. However, based on the classification guidelines furnished, the contractor had established area controls. In doing so he found it necessary to request interim top secret clearances for some of his guards. Our office was brought into the picture only after he encountered difficulty in obtaining and furnishing justification for interim clearances for the guards.

After an initial discussion with technical personnel of the facility, it became apparent that there was sufficient reason to question the accuracy of classification guidelines. Through the efforts of our office a meeting of interested parties was called. It was determined that the external view of the item in question revealed no

classified information. Access to the information required possession of the item so that it could be subjected to tests and close examination. It therefore became apparent that this item could be safeguarded in the same manner as a document. The individual working with the item could adequately preclude access by unauthorized individuals and it could be stored when not in use. Thus the need for area controls did not exist. The DD form 254 was subsequently amended by the procurement activity. The cost avoidance was indeed sizeable in this case.

The role of the cognizant security office in the area of challenging classification guidance has tremendous possibilities. We feel that as a result of our constant review and examination we can continue to discover obvious inadequacies or inaccuracies. However, the real review must necessarily be within the contractor facility by knowledgeable technical personnel. These people are most familiar with the state of the art. They know if the guidance furnished is adequate. And if revision is in order we at the local cognizant security office are ready, willing, and able to help.

We view this classification management program as tri-partite: one part contract administration, one part technical, and one part security. Through a team effort these three elements can assure a properly run program. I implore the contractors in this audience to set aside their inherent fear of disturbing the customer, and I encourage you to bring your classification problems to our attention. We will help, for we must have meaningful security guidance.

Good security starts with proper classification guidance, without which we do not have a cornerstone. We in the local cognizant office want to continue as an active member of the team. I thank you.

SCHIEDERMAYER: Thank you, Joe Sullivan. I ask the gentlemen who are going to pass the microphones among you to man their stations.

FRED J. DAIGLE, Lockheed: I am addressing my question to Frank May. I was real pleased to hear your comment about the possibility of letting the classification people in the projects sign the 254 as a contractor representative or as his agent, whatever you will. As you know, in industry, when we give out subcontracts, we give out all subcontract information to our subcontractors with the exception that we lack authority regarding classification guidance. Are you contemplating or have you given any consideration to allowing industry to sign DD 254's to subcontractors? In the present instance, we have to rely on the ACO, provided the ACO has been given this authority by the PCO. In many times, such as an RFP situation where time is limited, we are required to go clear back to the east coast or where the RFP originated to get a DD 254 signed to get proposal information from potential subcontractors.

MAY: We are attempting to do this because, as I mentioned, we feel that the more we can get the classification decisions centralized and the people who are conscious of this type of operation into the picture, we will

get better classification guidance and more consistent guidance. We do not anticipate, at this time, that there will be any change in the media or procedures involved in getting classification guidance to subcontractors.

DAIGLE: Consider the fact that we may have the capability to pass on this specification of the contract, as well as we do on all the other specifications in industry.

MAY: This may be true. I don't know the legality or the technicalities involved in passing over to a contractor the authority to pass on classification guidance. I have always looked upon classification guidance as just being another element of contract specification. But we have not gone that far yet. We are moving ahead a little slowly. We are trying to break ground and I think if we do as our State Department and move a little bit at a time until we get the full picture, it will work. Possibly Joe Sullivan might address himself to this. He is more familiar with the administrative contract operation.

SCHIEDERMAYER: Joe, would you like to add something to that?

SULLIVAN: No, thank you.

JIM BEUZEL, Cornell Labs: My question is for Mr. MacClain. This has to do with paragraph marking. I think it's good, but I think we have got to realize that in paragraph marking there is another marking on the first page of the document, namely, the group. If one of the paragraphs is, for example, Group I, does this automatically make every paragraph the same group or can we use — I'm certainly not suggesting we put the group after every paragraph — but can we use our own good judgment? I am suggesting that we do, that if we extract a paragraph we put it in Group IV, if it should be.

MacCLAIN: I don't believe I can give you a one-word answer to that. The intent of the group marking system primarily is that the document, in totality, has a group marking. If this were true, and if there were nothing else on the document, then you would not have the freedom that you were asking for paragraph by paragraph. There is a provision in 5210.47 that says that if there is something to be gained by putting group marking on a particular paragraph, this is appropriate and proper. Now just exactly where you get the authority to decide has to remain to be seen. I don't know. You have to use your good judgment. I would suggest that if you have anything less than absolute certainty, you raise the question with the user agency. What you are dealing with really is downgrading or declassification, which might be very important. I think your approach, generally, is all right. Take a good look. We have no requirement that group marking be added to paragraph marking at this time. Before I lose the microphone, I'd like to say that the words of Joe Sullivan were good as far as I am concerned. I am delighted. I like his word "implore." I'll add my emphasis to that. Let's be a friendly society on both sides of this particular question on 254.

MAY: We in the Air Force do use group markings on paragraphs and this is not as impossible as it may seem. When we get into this sort of a system, we follow the same thing as

we do in the classification marking. The group would be the highest group, the most restrictive group, contained in the document, which is obvious to avoid any possible error.

BEUZEL: I have another question. Is anyone in the Government studying the downgrading-declassification system? Are these arbitrary figures of three years in Group IV? Is any study being made to change these?

MacCLAIN: Yes, we are studying this matter. It is a very difficult task. It is not as easy as security classification in the first instance. It may be surprising, but it's true. We have definite ideas that in Group IV the period of downgrading and declassification can be shortened. We also have definite ideas that it is possible to simplify the entire system somehow. But, these ideas have really only been considered in our Directorate, and we have not, except for one instance, staffed them throughout the Department of Defense. We did staff one proposal for the reduction of the time phase in Group IV all the way through the Department of Defense, and then we ran across something outside of the Department that caused us to stop where we were for the time being. It is one of our biggest problems and we are working at it.

SCHIEDERMAYER: I have a couple of questions going. I want to ask one myself to Les Redman. Les, Group I includes Restricted Data. Do you see any evidence of any study with respect to having parts of Restricted Data out of Group I?

REDMAN: No, the provisions of the Act require a kind of treatment of Restricted Data that seems already to meet the objectives of the automatic time phase downgrading and declassification program, namely, continuous, thoughtful review both of classification criteria and of individual documents.

BOB DONOVAN, United Technology, Sunnyvale: This question is directed to Mr. May. He made reference in his talk to a classification index, or index of all the Air Force programs. Now is this an index, per se, or does this consist of the complete program guides themselves? I wonder if you could elaborate a little bit on this point. The reason for the question is that this is the first indication of perhaps a step in the direction of some form of clearinghouse, at least in one service.

MAY: Well, it's simply an index. A listing of all of the classification guides that have been published within the Air Force as individual guides, not something connected with another document. Our purpose in doing this is because we ran across a situation out in the major commands where someone had been working to develop a guide where we knew that there had been a guide in existence. So, we simply have listed all the guides, given the date, classification in some cases, a little explanatory note, and the office of primary responsibility. So that if, for example, the headquarters of SAC were interested in getting the guide on a particular program, they would be able to write BSD and procure a copy.

DONOVAN: You know that within the unified command structure that you have at SSD or BSD they at least have the opportunity to relate one

guide to the other. We find in our own case, particularly with the tri-service situation, where our own product effort might be directed down one trail, that you get conflicting interpretations of how the same information should be handled. It raises a whole host of classification problems particularly with your technical people. At least within the framework of the Air Force there is the attempt to establish a central clearinghouse to get some uniformity within the guidelines as to what will be classified in particular areas.

MAY: I certainly hope this will be a byproduct. For example, we just recently provided the Navy with three different guides because they were working on a pr gram with some similarity. This aided them in developing the guide they wanted to make up. Is this the kind of thing you mean?

DONOVAN: Yes.

MAY: And we would do the same for the Army and other components in DoD. We favor the exchange of classification guides in the Air Force and we wish AEC would have that same attitude.

DEAN RICHARDSON, Office of Industrial Security, Cameron Station: My question is directed to Mr. MacClain and the three headquarters authorities of the user agencies. One of our primary purposes is to stimulate rapport between industry and defense and AEC and user agencies, or as my boss likes to say, Colonel Cogswell, "Communicate now." I think for the record, particularly for this meeting, I would like to hear Mr. MacClain and the headquarters authorities of the three user agencies comment on this business of stimulating rapport between the user agencies and industry. I have, at this meeting so far, received comments from three industry representatives who still are afraid or at least reticent about approaching a user agency with their interpretation of what the DD 254 should be or their interpretation of what the DD 254 says. It must be recognized that when an industry representative or industry has the contract or is working on the contract, he is in a much better position to determine what should be classified. He cannot make the original determinations, but he can say, "Now we are coming up with a point, this doesn't need to be classified," or, "This does need to be classified." However, industry still hasn't been approaching the user agencies with this problem and I think Joe Sullivan touched on it a few minutes ago. I wish to have the committee of this meeting be on record as to how do we really, in Defense, feel about this rapport?

MacCLAIN: I'll make a statement for our office. We have always said, and now repeat, that we want security classification guidance between industry and the DoD to be a two-way street at all times and anything that we can do to facilitate it we will do. We know of the reticence of contractors to raise questions sometimes, but we ask that they not be reticent and that they do raise these questions. When Joe Sullivan said what he had to say about the role they are performing in assisting in the raising of these questions, I think he said what had to be said. I personally think he

said what I believe in. I hope that the user agencies will never be reluctant to receive questions of adequacy of classification guidance.

KEN WILSON, Sylvania: I wonder whether anybody could clarify for me the exact intent of a very simple thing. An "X" in a box in the DD 254. We get conflicting opinions on this from various contracting officers. The first sentence said it was the highest classification that was assigned information in a particular subject and he went on for two paragraphs and his concluding sentence said that unless we had written direction from the COTR it was to be the only classification assigned it. So we get the question from our technical staff, "Is this the only or is this the highest, or is this the formal classification that we should look at for this information?" I can't find it any place, and, as we found out yesterday, these scientists expect that it be logical. I get sort of lost.

MacCLAIN: I'll be honest with you. I don't understand the question. If your question is what is the level of classification that should be attached to a particular document or a particular piece of hardware from which information can be obtained, then I would say that unless this thing is in a unit as a single document or a single anything, then you have to treat the totality at the level at which the totality is classified. I really don't understand your question.

WILSON: Let me be more specific. The subject that came up the last time is an "X" in the box for monthly status reports. The "X" was confidential. Now, two of these reports said "we are still working, boss, we haven't made any significant advances. We haven't lost time; we are still chugging along." They said it in about one paragraph. They didn't tie to it any contract numbers or other things that make things classified and our engineers, and I think with reason, asked why is this confidential. They could not see any confidential material in there and it revealed only two copies were created and it went to the user agency. It did not say we were ahead or we were behind. It just said we are still here. This has come up on other boxes and other cases.

MacCLAIN: It is perfectly appropriate for engineers to raise questions and appropriate for you to raise them with the user agency. I suggest you do that. Raise the question and then you will both agree on the answer.

WILSON: I did and I got a double answer.

MacCLAIN: I don't understand why you should, and I am sorry.

MAINES: You will probably get an answer "Block Item 3" which is talking about the highest level of classification that will be assigned to the total contract. If you go to Block Item 9 where they start breaking down the details, it is undoubtedly an Air Force contract you are talking about. To my knowledge, they're the only agency still deciding whether or not you classify monthly progress reports.

GEORGE CHELIUS: This question is directed to the user agencies. It regards information, property rights, and retention that is nonpatentable. Now, when a company or

a contractor works on a contract for a certain period of time, it would appear to me that we should at least have the benefits of the retention of the report or the information that we generate pursuant to contractual documents. I think we have in some cases put in a lot of time, effort, and money from a cost standpoint as well as receiving some funds from the Government. I think that we have a property interest in classified information. I was wondering what or how you can tell us to destroy this information in which we have actually vested property rights.

MAY: Well, it sounds like a DoD problem. If I follow you — if you are going to build a house and you contract to build this house and you give him the plans or the contractor maybe develops these plans, then when the project is all completed it becomes yours. Maybe this is somewhat, I think, what we are talking about. You are contracted to do a job. Everything that you produce in this has been a product for which you have been paid.

CHELIUS: I would concur with that. However, there are certain, perhaps, design features that you would like to incorporate in the houses which I think you have a right to retain. But by merely stating to the ACO that you would like to retain this and use it for other programs, it is not sufficent from the user agencies point of view.

MacCLAIN: I'd like to take a try. I think Frank was close to being right in the first instance, but the informational content of a classified document certainly is something that the contractor who developed it doesn't get rid of by merely destroying the document that contains it. The question of his ability to use that information in some other way in the future does not mean that if he does use it, it would be wrong. But it certainly probably means that if he does use it, he is not to classify it. I think that the question is mixed here as between protecting classified information and protecting property interests in that information.

CHELIUS: The question is in retaining the information. If we have to destroy the material or return it, we don't have a source from which to gather the information.

MacCLAIN: I am afraid that the individual case ought to be submitted for a decision. No generality could deal with it that I could think of. It is a challenge of what you believe you own and what the Government believes it bought. I honestly don't know the answer, as a generality.

M. D. AITKEN, AMC: Question for Mr. MacClain. Before I ask the question, however, I would like to address myself to Dean Richardson's question of rapport between the user agencies and their contractors. Let it be stated for the record that the Army has been, and will continue to be in the future, in bed with all of their contractors and I don't know how we can establish any closer rapport. George, are you working up any cost data other than your 28 September figure for inventory? For example, how much does it cost to sample confidential documents for review against downgrading and declassification requirements? How much does it cost

to inventory secret documents? How much does it cost the Government to maintain secret documents in their inventory?

MacCLAIN: We have a figure on the cost of handling in transit. At the present time we have no study under way to determine the cost of keeping something in storage. We have no present figure or any present project for determining the cost of inventorying secret as against top secret. I guess we will probably try to determine hard data costing in the future, but I can't tell you specifically when. I hope I answered your question.

AITKEN: Yes, you did. The motivation is that program approval is assured these days when you can demonstrate cost avoidance or cost reduction. And we are looking for these items.

MacCLAIN: We will welcome a specific plan on obtaining hard data on costs.

SCHIEDERMAYER: I would like to thank, individually and collectively, our panel of George MacClain, Frank May, Chuck Poenicke, Howard Maines, Joe Sullivan, and also Les Redman, for being with us this morning.

DONALD WOODBRIDGE: Our speaker today is a man of extraordinary talent and wide-ranging activities. If I were to do justice to his accomplishments, I would leave him no time to talk. I shall try, therefore, to be brief.

Dr. Carter has been Senior Vice President of the System Development Corporation since November 1963. In 1964 the Corporation also named him Manager of Research and Technology Division. Here are some of the duties involved in that job: generally direct a staff of approximately 125 professional mathematicians, programmers, psychologists, research scientists, and research and technology work, and the system sciences, including programming techniques, experimental design in statistics, systems simulation, artificial intelligence, decision making, training, etc. Since February of 1965, however, Dr. Carter has been able to devote full time to his position as Senior Vice President. He is by profession a psychologist. After being graduated from the University of Washington as a Bachelor and Master of Science, he went to Princeton where he earned his degree of Doctor of Philosophy in psychology. He has put his training in psychology to use as an officer in the Air Force directing the research in the selection and training of navigators, as a research psychologist in the medical laboratory at Wright Field, as Professor of Psychology at the University of Rochester, and as Director of Research at Fort Ord, California. That is the position he held before coming to SDC. His affiliations: Fellow of the American Psychological Association, American Association for the Advancement of Science, Psychological Association, Society for the Psychological Study of Social Issues, Association of American Scientists, and Association for Computing Machinery.

As I look at Dr. Carter's career and review the imposing lists of the many, many committees, boards and working groups on which he has served, the

many, many articles he has published, I seem to discover two important and continuing quests, leitmotivs or themes you might say: how to find and train leaders of men, and how to foster the symbiosis of the man and the machine. Then I noticed a particular quest whose name has always fascinated me, artificial intelligence. It was a name that seems deliberately chosen to provoke the shock of ambivalence, an attention-getting device that is very popular today. You encounter it in slogans or catch words like, "Drink Vino, the dry sweet wine," or, "Dynamic conservatism." There is a great temptation to digress at this point and play on the implications and uses of ambivalence. But, instead, let me present to you a man whose intelligence no one would classify as artificial, Dr. Launor Carter.

NATIONAL DOCUMENT HANDLING SYSTEMS IN SCIENCE AND TECHNOLOGY

by Launor F. Carter

Thank you, Mr. Woodbridge, for that excellent, complimentary, slightly untrue, introduction. I must say that I am very impressed at the number of you here today. I had a speaking engagement in New York on Tuesday, and on Monday morning, after I was all ready to leave, I got a call saying, "I am sorry we have had to cancel." And there I was on my way to New York, but no speaking engagement. But here you all are and I am terribly pleased that you could get here and stay for so long.

I want to talk today about some problems in document handling and particularly about a study that I had the real pleasure to be associated with last summer. The Committee on Scientific and Technical Information of the Federal Council for Science and Technology wanted to have a study undertaken of the large total national document handling problem. We had a contract to do that. Eight of us spent all of a hot, sweltering summer in Washington undertaking this study. So I thought that I would like to tell you about that study, about kinds of problems we looked at, and about the conclusions we came to. I think it is worthwhile doing this because, I believe, it will serve as the basis for the establishment and slow revolutionary development of a truly national system for the handling of scientific and technical documents and information. This is my text. This is the study and in it is my text. I'm not going to read all of this, but I am using it as a set of notes.

The problem of handling scientific and technical documents is by no means a new one. It is one that has been with us a long time, particularly since World War II. The Congress has held a number of hearings on this subject. Congressman Pavinski of Chicago has tried several times to solve this problem by establishing a mammoth computer switching base in Chicago and somehow he hasn't gotten it through Congress. His efforts have been worthwhile because they have stimulated the Executive Branch of the Government to look at this question quite seriously. I think the Russians have also helped us.

As many of you know, there is a Russian organization known as Vene-

ti. It is a rather large centralized abstracting and indexing service which serves most of science and technology in Russia. There are lots of pros and cons about how well this works. But because it is a problem in our country, the fact that the Russians have tried this effort has made us look rather closely at it. I think we haven't gone that far, and we're not about to go that far. But, we do have this example. So both Congressman Pavinski and the Russians have stimulated a lot of thought about this subject.

Some of you, no doubt, are familiar with the Crawford report which, in 1962, was sponsored by the President's Science Advisor and recommended quite a large number of changes in the handling of scientific and technical documents. By and large, the recommendations of that report were not followed. But Wineberg, of the Oak Ridge Lab, followed up the Crawford report and in 1964 came out with probably the most thorough study of it and recommendations for the scientific and technical document handling problems. The major result of the Wineberg report was the setting up of COSATI, as an overall coordinating body within the Government for this general document handling problem. COSATI has sponsored a large number of efforts to coordinate activities throughout the Government. It has on it representatives from all of the major Government organizations — Walt Carlson from DoD, John Cherad from AEC, and so on. Last summer they decided they really wanted to have a thorough-going look at the total national problem. So that is where we came in.

Now, one wonders what is the problem. One of them, and I think the basic one, is that the Government has not defined its role and responsibility with regard to scientific and technical data handling. Each different department has a different idea of what it ought to be doing. Some departments like the AEC, NASA, DoD perhaps, have struggled with this problem and tried to define various roles. The AEC publishes various journals and abstracting services and so forth. NASA does too. Other departments don't do anything at all. There is no uniformity whatsoever. And so this lack of uniformity, and this lack of consistency from department to department leads to confusion. So one of our first definitions of the problem was that the Government had to get some consistency within his own house.

Another problem, of course, is the increasing number of uses of scientific and technical information. In 1960, for instance, there were about 2,370,000 scientific engineers and technicians in this country. By 1970 it is going to be in the order of 4,000,000. So here in ten years you are having almost double the number of users of scientific and technical information. Likewise, the number of publications is increasing very rapidly. In fact, it doubles about every twelve or fifteen years, something like that.

In 1961, for example, there were 658,000 different scientific and technical publications that came out. It is estimated that by 1970, there will be 1,143,000. An interesting figure to put in the back of your mind is that the Library of Congress has 43,000,000

items in the Library and it has increased 108 percent in the last 26 years. This problem is growing and growing and growing. It is getting to a critical stage. The libraries are not able to handle the data and something needs to be changed.

Now there are a lot of evidences of the statement I just made. The Library of Congress cards are falling further behind. This year they got a five million dollar appropriation, part of which will be used to pick up the backlog in that area. Some libraries weren't able to process the books and journals that came in. They were falling further and further behind. They are restricting their service. I know a library in this area which some time ago used to service industrial contractors and has now decided that they must stop doing that because they didn't get the personnel and space to do it. These are simply examples of the problems that libraries are facing. I have a large number of these examples, but I won't go over them because of the time.

I think that most of us hope that the new technologies in the computer sciences and in the photo reduction sciences would help solve these problems. The facts are, I believe, that by and large, this has not been the case. If you look at the places where automation technology has been applied to the document handling problem, you can almost count them on your fingers. DDC has some capability there. NASA has a fair amount with their docking installation. Medlars has some. There are a few libraries that do a little bit, but very few. So, by and large, automation simply hasn't been applied to the scientific and technical data handling problem. One of the reasons is that the Government has not supported the development, the background development, that needs to take place before automation can really be well applied to the document handling problem. And I say the Government because it is largely the agency responsible for this very large explosion in documents and in users. So we in the automation field have not, I think, been able to adapt our technologies to document handling to the extent we have to other problems such as command and control or accounting payrolls.

Another problem is that of long range planning. You find one agency going off in this direction or one company going in that direction, and no coordination and no long range plan. That needs to be fixed.

Those are some of the problems. What do we do about those problems? We started out by studying this problem in three ways. First we looked at all the past proposals we could get our hands on. There have been about fifteen major efforts to deal with this problem since World War II. We have abstracted these and summarized them and they are all in this report, which incidentally, is available to anyone that wants it.

We also looked at the question of users and what users' reactions are. We located some seven hundred articles dealing with users' reactions with the scientific and technical document handling problem. About fifty of these seemed to have really factual information where they have done studies of what users think. The thing

you get out of this is that users tend to be fairly dissatisfied with the service on the one hand, and on the other hand they tend to know not much about what services are available.

The third thing we did was to visit some forty-seven different libraries, document handling services, institutions involved. And the second volume of our study is essentially a summary of the statistical data, the studies that have been done before, the user studies, the whole document handling institution as looked at first from an institutional point of view on the one hand, and secondly from a document flow point of view on the other. But that was not our major problem. Our major problem was to try to figure out some ways of dealing with the Government responsibilities in this area.

The first thing we did was to try to formulate the basic assumptions, or the basic underlying propositions, that we felt were fundamental to bringing order into these problems. We formulated some fourteen different problems. I just mention four of them here to give you the flavor of the kind of propositions that I have in mind.

The first proposition, and by and large the most important, is that the Government has the responsibility to assure that there exists within the United States at least one accessible copy of each significant publication of world-wide scientific and technical literature.

Another is that the Government has the responsibility to assure that any significant world-wide scientific and technical literature is appropriately acquired, announced, and processed.

Third, the Government has the responsibility to assure that the world-wide scientific and technical literature is accessible to qualified individuals in the United States.

Fourth, that proposed systems should be revolutionary and they should start with the present system and evolve the forms consistent with an overall plan.

Now, most people in hearing the first proposition tend to draw back and say, "My God, you can't really believe that or mean it." It implies a tremendous amount of centralization, that the Government has never done this sort of thing. But after you consider it rather carefully, I think most people accept the idea that indeed the Government does have the responsibility to assure that there exists some place in the United States—not in the Government necessarily but some place in the United States—at least one accessible copy of each significant publication of the world-wide scientific and technical literature. Each phrase there can be elaborated at considerable length, and in our study we do. For instance, there is the problem of what does one mean by a "significant publication." Many people feel a lot of stuff published isn't really very significant. But, you have to point out that before you know whether something is significant or not, somebody has to make a judgment about it. And, when you consider that around sixty percent of all scientific and technical literature is published outside of the United States, then somebody has to be looking at the world-wide literature and

saying, "Is this something that we should have in this country or not?" And at the present time, nobody has any consistent responsibility for this kind of a question-answering. It means you have to have some organizations or individuals assessing the significance of the open publications of the world.

So what is significance? You've got to make some judgments. It is really a question of economics, in a way. How much are we willing to pay for the knowledge of the world-wide literature? We certainly want to do it for regularly published serials of all kinds. We want to do it for monographs, we want to do it, maybe, for occasional reports. You get into these judgmental factors. At the present time, no one is making these judgments. Somebody ought to be making them. I shouldn't say no one is making them, but it isn't done systematically.

Another phrase is that the Government has the "responsibility to assure." That's a new responsibility this Government has and we argue that the scientific and technical information is a national resource in the same sense that water is a national resource or land is a national resource, and that you don't let a national resource be exploited by happenstance. I think in our country now we come to the stage where we look upon our national resources as something that, in the broad sense, is a management responsibility of the Government. It doesn't mean the Government does all of these things and it doesn't mean that it does the detail and it doesn't mean that it operates. It means we look over our national resources, whatever they may be, and have some policies with regard to them. And we think that scientific and technical literature is a national resource in that sense. Obviously, we have private libraries, private companies with information systems, and university libraries. Many of these are doing an excellent job, but there is no coordination. By saying that the Government has a responsibility to assure, we mean that they need to look across this and see if we have bad gaps. There are some areas of science where we think there are gaps and should be assured that these things are getting done.

There is quite a discussion of this whole issue in this study. Now, how did we recommend all this to be done? There are lots of ways you could do it and it's not really clear that one way is terribly superior to another. But we did formulate about five basically different approaches to this problem and tried to evaluate the merits and demerits of each.

The first approach involves two concepts. The two concepts are what we call the capping agency concept and the responsible agency concept. These two go together. The capping agency would be a federal agency that essentially is responsible for coordination and policy in the scientific and technical documentation area. It is clearly a centralized responsibility. In that sense a lot of people don't like it. But if you're going to deal with this problem on a national level, you've got to have some kind of national policy. Somebody has to do that.

Now here are the functions which we thought such an agency ought to perform. If you disagree with the concept of centralized agencies, you ought to ask yourself, do you disagree with the functions. If you do, how would you get these functions performed? It is all right to disagree, but you have to have some kind of alternative. The functions are to formulate policy in the area of responsibility for national scientific and technical activities. Somebody has to formulate policy.

Second, formulate federal policy with regard to nongovernment libraries. You might ask why that is an issue. Well, it's an issue because the Government supports portions of many nongovernment libraries, but in a very inconsistent fashion.

Third, formulate policy with regard to information centers. Some information centers are presently supported by the Government, others partially, and others not at all.

Formulate policy for depositories of Government documents. There are twelve hundred different libraries that are depositories of Government documents. Some have been supported and some haven't. Some have been supported and suddenly had the support yanked away and it's a fairly messy situation.

Formulate policy for the support of nongovernment publications. As you may know, many scientific journals are supported by the Government by page charges, some by direct subvention, some by allowing certain overhead charges, and it varies all over the place. There ought to be some policy.

Sixth, formulate policy with regard to nondocumentary communications, symposia, laboratory visits, preprint situations and so forth. There is no present policy between the different departments.

Seventh, collect statistical information. One of our hardest problems in this study was that you couldn't get any statistics you really believed in. In almost any area, you could find three or four different statistics that varied significantly.

Eighth, establish standards. The problem of standards is going to get, I think, particularly difficult as we go into automation. The problems of titles, of format, and so on, all of these, if we're going to have a coordinated system, are going to have to have standards.

Ninth, recommend science information research. NSF, of course, does scientific research. We are not proposing that the capping agency do it. Simply recommend what's needed. Promote the development of information technology.

Eleven, formulate policy for the training of librarians and information technologists. It is a sad commentary, I think, that the rate of growth of information scientists and librarians is slower than the rate of growth of other scientists and technologists. So the libraries are falling further and further behind.

Formulate policies for foreign documents.

Publicize information services.

Perform budget review and funding control.

Formulate policy for legislative relations and legal matters.

Develop long range plans.

Now, here are sixteen functions and somehow they ought to be performed. We couldn't figure out any good way to perform them except to get some agency to do it. So we have proposed the establishment of what we call the capping agency, which, in some ways, would be like the Civil Service Commission and like the Bureau of the Budget, in performing these coordinating functions for the Government. We are talking about an expenditure on the order of four hundred million dollars a year in the scientific and technical document area. You may not like centralization, but if you don't, ask yourself how do you perform these functions within the Government. And if the Government is going to spend this amount of money, there ought to be consistency with regard to it.

The responsible agency concept is, I think, an important key, and often overlooked in this problem. The idea of the responsible agency was originally proposed by Wineberg. He called it the delegated agency concept. NASA and the AEC are currently delegated agents. The AEC is responsible for supporting scientific and technical publications in the area of nuclear engineering, for instance. They support the nuclear engineering abstracts. They support the physics publications, and so on. They understand and have done a good job in supporting these. Now NASA does the same thing in space technology. Medlars, in the medicine area, is another example. But, in the rest of science and technology, except on a hit and miss basis, there is no clear responsibility. We suggest that each of the major departments and agencies of Government that have scientific and technical responsibilities that support these areas ought to have delegated to them clear responsibility for the support of scientific and technical documents and publications. In our report we lay out, for each field of science and technology, the department that seems to have the major responsibility in each area. I think the Wineberg report did not get the support it should have gotten in this recommendation because they did not go to the detailed problem of looking, in detail, at the different areas of science and technology and in clearly spelling out departmental responsibilities.

We tried to do that and I think it is a fairly major contribution. Now that is the system that we recommend. There ought to be a capping organization with the delegated agencies concept. Let me say, again, that the delegated agent is not necessarily the agent that does, within its agency, all of this work. It may very well want to contract out with private industry or with universities or information centers, the doing of the work. But, they should see that it gets done.

Now, another concept we developed, a different one, is the idea of a new operating agency within the Government. One could argue that the setting up of a policy setting organization and the operating of the Government's responsibility in this area could be done by one integrated national agency. This will get you better integration. You would have cas-

ier standard setting, and so forth. We evaluated that concept at considerable length. There are a lot of attractive features to it, but we felt it was not as attractive as the capping agency-responsible agent concept.

Another idea is that there be a Government-chartered corporation. Somewhat in the way that COMSAT perhaps is. They have a monopoly. This agency would have a monopoly for servicing the Government in the scientific and technical document area. It would sell its services, also, to any parts of industry that wanted to buy them. There is a lot of attractiveness of this feature, because in the scientific and technical area you have so much involvement of the universities, of Government, of industry, that something outside of any one of them might be more acceptable than one within the Government. We developed that idea at some length. If it were not for the somewhat radical problems involved in setting up such organizations, we might well have plunged for that.

Another idea is to establish a National Library Administration based upon the Library of Congress. And this really is a good idea. The Library of Congress is a marvelous depository of a lot of scientific and technical literature as well as other literature. The National Agriculture Library, and the National Medical Library are the other two national libraries. There are some three hundred other libraries in the Government which could form the nucleus of a very fine scientific and technical documentation organization. The trouble with it is that the Library of Congress is the Library of Congress. That is to say, it is run by Congress by a joint committee of Congress, and it is not in any way under the direction of the Executive Branch of Government. And since the Executive Branch of Government is, in our system, the operating branch of Government, they can't delegate their responsibilities, in a sense, to Congress. So you have got to change the organizational affiliations of the Library of Congress to make this work. And that is just an impossibility in most peoples' judgment.

The other idea was simply to strengthen the existing system. We looked at that carefully and concluded that, although there were many able organizations trying to deal with this problem — The National Science Foundation, the Smithsonian, the departments I've already mentioned — the problem seemed to be getting more and more difficult all the time. COSATI, as a coordinating agency with representatives from each of these departments, but simply a coordinator having no authority, could not perform this function. And we felt the situation was going to get pretty bad unless some greater authority were exercised by some agency within the Government. Now each of these things are spelled out, like thirty or forty pages in the report, and at the end we tried to evaluate each of these different system requirements that ought to be filled by any one of these organizations. The capping agency-responsible agency came out slightly ahead of the others, but not very much. And in the end, the judgment was about the political and adminis-

trative feasibility of each of the recommendations. So that's what we recommended.

The recommendations went to COSATI last September. In November COSATI adopted a formal set of recommendations for national document handling systems in science and technology. By and large they went along with what we recommended. I just read a little of their summary recommendation. The COSATI report says, "The Office of Science and Technology," this is Dr. Horned's office, "should accelerate efforts on the overall planning, policy formulation, organization, coordination, and evaluation of the integrated national network of information document handling system in science and technology. The OST should take appropriate steps to clarify areas of responsibilities among the federal agencies in this area. The OST, in collaboration with the Bureau of the Budget, federal departments, agencies and other organizations, should undertake the following: develop a comprehensive, coordinated program insuring the required cataloging and announcing of the significant world-wide scientific and technical literature; establish one or more national libraries in the field of science and technology in addition to medicine, agriculture, and so on; develop policies concerning the library basis for the documentation information services; propose and endorse legislation necessary to enable the departments and agencies to assume the responsibilities that I outlined previously."

Well, I won't take the time to read more of this, but by and large, they endorsed the positions that we took, with one exception. That one exception was that they were not willing, at this time, to endorse the establishment of a capping organization as we recommended. They rather suggested that OST itself serve this function since it is a part of the Executive Office of the White House. Now it was our judgment that OST couldn't do this. Not that they couldn't do it, but it was impractical in the sense that they would have to so increase the staff of OST that the President and Dr. Horned would not go along with it. Time, I guess, will tell whose judgment was correct in this. So far it is kind of a stand-off.

I talked with Bill Knox just yesterday. Bill is, as many of you know, Dr. Horned's special assistant for scientific and technical information and information processing. Bill's feeling was that they were still going to try to do it within OST, but he was becoming somewhat more discouraged about their ability to put it over, and they might have to turn around and go the way we suggested.

That's kind of where things stand now. I feel quite confident that there will be, in the next year or so, some very significant federal actions to achieve greater coordination and greater funding in this area. The major inhibitors, as far as I can tell, are the current involvement in Vietnam and the budgetary situation. If the various recommendations were implemented, the four hundred million dollars that is spent today might go up to five or six hundred million with an ultimate reduction, I think, as a better system was developed and

more automation involved. But in view of the growth of number of people involved and the number of documents involved, we shouldn't look for any significant reductions, I think, in the total investment.

I have had a number of talks with people in executive positions in the Government and so on. They all recognize this is something they have got to do. The problem is where are they going to get the money and how, administratively, are they going to get it done. I myself was extremely pleased to have been associated with this effort, to have had the privilege, in a way, of looking so carefully at this really vast and important area, and to have made some contribution to what, in the future, will be a more viable, important, and greater national resource. Thank you.

PANEL – CLASSIFICATION MANAGEMENT IN THE COMPUTER ENVIRONMENT

BOBERG: On occasion, you have a situation where you have a group of people and a man who come together when you could use the old classic expression that here is a man that needs no introduction to you. Such is the case this afternoon. I think you realize that I am speaking of the moderator for this afternoon's panel, our own Lorry McConnell. I thought that perhaps there might be some notes about Lorry that you did not know or were not aware of. I will pass them on to you.

Lorry is a native of Butte, Montana. He currently holds the position of Head of the Classification Management and Editorial Liaison Office of the System Development Corporation. As you know, he is currently the Vice President of our national society. He received his Master's degree in English from the University of California at Los Angeles in 1953. Lorry has been working in the area of publications and classification for over twelve years. In addition to his responsibilities for SDC — their classification management program — he coordinates SDC's technical document and book publishing effort. Again, a man that needs no introduction to this group, my very good friend and a friend of our society, Lorry McConnell. By the way, Lorry, as I think you all know, has put together the program that we are enjoying for these three days. He is the program chairman.

LORRY McCONNELL: Thank you very much, Dick, for those very kind words. The idea of having a panel on the subject of classification management and computer environment was one I sometimes wish I hadn't thought up. I feel quite inadequate to attempt to moderate such a panel but I had such strong convictions about the importance of this subject's coming to the attention of classification management people that, in a moment of weakness, I felt I could volunteer to do it. I am not going to be the Les Redman kind of moderator and I hope you will forgive me for that. But I will attempt to remain as anonymous as I can and allow these informed and distin-

guished gentlemen to my left to convey the important information to you that they have brought. I think that if it hadn't been made clear to us before, the remarks we heard yesterday and this morning from our distinguished scientific guests should make it abundantly clear that classification management must address itself squarely to the problems of information and computer environment. Yesterday, Dr. Fernbach described the computer complex enclosed by a high wall of security and in which there was very little chance of discriminating between that information requiring protection and that information not requiring protection. And I tend to think that the situation that he described is fairly typical of most of the computer areas where classified information is processed. I think this is true because we don't know what else to do. We lock up everything inside and that's about as far as we can go However, as Dr. Fernbach indicated, this gross "padlock" approach, if I could term it that, is intolerable. Further, as the future brings time-sharing techniques and other similar advances, I think we will find that there is a greater opportunity for computer complexes to communicate with users at remote stations so that the high wall of security around the computer complex will increasingly become not only intolerable but unacceptable as a method of protecting classified information. Also, I believe that we in classification management must recognize the possible potentials that the computer holds for us in helping us to solve some of our basic problems. Here with us today are three gentlemen who have given considerable amount of thought to this and who have much experience to bring to us along these lines.

The first of these gentlemen is Mr. C. Donald Garrett, whom you have heard before at the seminar and who, as you know, is the Deputy Director for Classification Management, Office of the Assistant Secretary of Defense, Administration. Don was born and raised in Pennsylvania. He received a B.S. at Franklin and Marshall College in 1931, taught high school for a couple of years, and then entered Government in the General Accounting Office in 1936. He was inducted into the Army in December 1942, was commissioned a Second Lieutenant in 1943, and left the Service as a Captain in 1946. He then took a position in civilian personnel work in the Office of the Secretary of War which was the designation at that time. He became Executive Secretary of the Security Screening Board and the Security Review Board in the Office of the Secretary of the Army in 1951. He studied law under the G.I. Bill at George Washington University where he received an L.L.B. in 1951. He joined the Office of Security Policy and the Office of the Assistant Secretary of Defense, the old manpower organization where his office formally was established, in January 1958. He took his present position in classification management in March of 1963. Don is a Lieutenant Colonel in the U. S. Army Reserve, Retired. He is a member of the Bar in U. S. District Court for the District of Columbia, U. S. Court of Appeals for

the District of Columbia, and U. S. Supreme Court. He is also a member and a new director of NCMS and a member of the Federal Bar Association. It gives me very great pleasure to bring to you Mr. Donald Garrett.

C. DONALD GARRETT

My subject, "data automation for classification control," raises all kinds of interesting thoughts, doesn't it? This computer bit is so staggering in what it can do that it even suggested to me a long time ago that there ought to be a place for it in classification management. But what and how?

You computer people and many of you "seclassifists" long ago were prompted to apply computer techniques to various phases of classification and security. Document control, including downgrading and declassification notices and action, has been set to computer music by many of you. I would suppose that you machine people long ago developed a fairly standard program to take care of such things. This is not the kind of classification control that I have in mind.

With the great quantity of various kinds of equipment used in DoD, sooner or later computer techniques were bound to be developed to maintain records on what was classified and what was not. I'm thinking specifically of Military Handbook 140, many of you once knew it as JANAP-140. Mil-140 is the book that lists all the electronic equipment, and many components and parts used in DoD, and shows who has primary cognizance over each bit and what is classified at what level. It covers over 100,000 items, I believe, and about 30,000 or so are listed as classified. The people who put this together, (a bow to the people in the old Bu-Snips in Navy is in order for monitoring the show) used a computer to put together all the data. It's a wonderful book and provides a quick reference showing the various items of electronic gear that are or are not classified.

It's a pretty good trick to put something like Mil-140 together. It took something like eight or ten months to do it, I believe. The Air Force says that going through that exercise they found almost half of the items that were listed as classified should not have been. Even some electronic equipment for the B-17 of World War Two days was still listed as classified. It looks like we need to keep some better control over classification.

This is one kind of computer application for classification control but it's not what I have in mind. It's useful to know what items of hardware are classified and at what level, but this really is the end product of someone's classification management action, so to speak. It's all right in some circles, as in logistics channels and in production lines, to think of classification in terms of hardware items, but there's a lot more to classification than that. It is in the more fundamental aspects of classification that I am suggesting that, perhaps, computers could be used to do something more toward classification control.

Right now there is no one place in the Department of Defense to which any one can go to find out what is classified about any particular program, project, study, operation or

even item of hardware. There are not even a small number of points of contact where the answers are available.

For example, the Directorate for Security Review, in Public Affairs in the Pentagon, gets for clearance a paper from an engineer in a company plant covering advanced radar principles. Being a subject of interest to Army, Navy, Air Force, ARPA, DDR&E, maybe even DIA, Security Review has to fan out copies of the engineer's paper to all those points. Army may have to send it to Fort Monmouth in New Jersey. Navy would would send it to the Research Laboratory in Maryland and might even send it all the way out here to Mugu. Air Force probably would send it to Fort Hanscom in Bedford, Massachusetts, or to Rome, New York. All this takes time and much effort and expense. Wouldn't it be a good idea to have one spot where Security Review could go to check out the many items of information in the engineer's paper real quickly?

One point to remember is that here we are not talking about a particular item of equipment, like the AN/APQ 56 or whatever you call it. Here we are considering theory and the application of theory. Really, when you come right down to it, this is where good classification can be much more effective than in connection with individual items of equipment because the decision could affect many items of equipment.

Another example: somebody, somewhere, comes up with a new project. Let's say it involves the application of laser techniques. Where does the project officer go to get help in making the very necessary classification decisions? How does he check out what should be classified? He can refer to DoD Instruction 5200.18 issued by DDR&E, where he will find guidance covering general categories and subcategories of laser applications and research. He needs to go further to determine what is sufficiently special about his application of lasers to his particular problem to decide what needs to be classified.

It has been suggested that there be one place where all program and project officers could go to get a reading on all the things that are generally classified in their projects.

Consider another perplexing problem, really in two parts. Suppose you are a project officer given the job of developing a super-duper infrared reconnaissance system. Where do you go to find what has been published about infrared? How much of this published material affects what you are doing? What technical intelligence is available? Here are the two aspects of your problem, the open literature and the unknown quantity of the state of foreign development, that vitally affect classification.

One place of reference where you could go to find out all about what has been going on in your field would reduce the scope of your problem. I'm not supposing or even suggesting that a project officer would be assigned to any project in which he is completely green, but he needs help in analyzing the state-of-the-art in his field unless he is a, or the, recognized authority in that field and knows all there is to be known about it.

One more example seems appropriate: occasionally, top level officials of the Government —the President, the Secretary of Defense, the Secretary of one of the services or one of the top level generals — makes an official public pronouncement in the form of testimony on Capitol Hill or in a press conference that includes information previously classified. When this occurs someone must decide exactly what needs to be declassified and to send out appropriate declassification notices to all interested parties.

To do this job it is necessary to review the transcripts and pick out the data that may have been classified. In many cases, the subject matter of the testimony or the press conference may cover many subjects and a host of data having technical, tactical or strategic importance. The principal problems involve identifying the specific items of information that had been classified prior to the pronouncement, which now require declassification, identifying the parties having primary interest in the various subject matters, and sending out the appropriate declassification notices. Part of the difficulties stems from the nature of these pronouncements and the manner in which the information is collected and assembled. Solutions could be speeded up if there were one spot in DoD where we could go and get a reading on what was classified and who had cognizance over it.

The answers to these and many similar problems would expedite matters. But what should be done? At first glance it would seem that the solutions should not be too difficult. But exploration and analysis shows that there are many complications. Here's where we run into trouble in planning this concept I have in mind.

The real rub comes in the complexity of DoD operations. There probably is not a single field of human endeavor but somebody in DoD is working in it. Because we are constantly striving to be first (Number 2 is not good enough!) in the development of new and better equipment and techniques, much of what we do is research and development. As soon as you say R&D, you think of classification. This means that at any one time hundreds of scientists and engineers, in almost as many fields of interest, are busy on work that is or may be classified. Problems of classification extend all the way from the initial concept to the ultimate hardware, covering hundreds of items of information. This is not only in DoD but in industry, too.

How widespread is our DoD interest, really? I doubt that anyone knows for sure. Probably one of the best sources of information on the total scope of DoD scientific and technical activity is contained in a book called "Thesaurus of ASTIA Descriptors." ASTIA is now, of course, the Defense Documentation Center, DDC. That thesaurus is designed to provide a means for cataloging and indexing scientific and technical reports, mainly to facilitate secondary distribution to eligible interested parties. It is not set up to show, and it does not indicate, the kinds of information that warrant classification. But it does give some idea of the scope of DoD scientific and technical interest.

In the DDC thesaurus there is a

general descriptor field listing 26 items, like areospace, biological and medical science, guided missiles, ordnance, etc. The 26 fields are divided up into 170 descriptor groups. Under "ordnance" are 19 items, including ammunition and explosives, ballistics, bombs, etc., and under "propulsion" three items, engines, propulsion and rockets. Then the descriptor groups are repeated separately with individual descriptors totaling about 5,500 items, many of them appearing in several groups. This is a whale of a lot of stuff.

The Military Electronic Sytems Catalog, very conveniently compiled and published for the world to see by *Armed Forces Management* magazine, listed in one issue 779 AN systems, 281 electronic systems with project names and 35 "L" programs. But even that catalog doesn't list all the electronic activity.

At one count, I believe, there were something like 478 research projects under way. A listing by a commercial establishment shows about 280 major weapons systems, programs, and projects in DoD. And so on and on.

Not only do we have a problem in scope of interest but also in "who does it." At last count there were 624 DoD officials designated to exercise original top secret classifying authority, 8554 had original secret classifying authority and about 32,000 had original confidential authority. Now this doesn't mean that all those people are, in fact, making original classification decisions, but they could. Consider, too, that each system, program or project officer or manager, all four or five hundred of them, all over the country, must make classification determinations. These are really the people who have the job of deciding what should be classified in the hundreds of different DoD systems, programs, projects, operations, equipment, etc. Nobody believes it would be practical to centralize that determination activity into one spot but the desirable solutions to the many questions I mentioned earlier suggest that it might be a good idea to have all the determinations that those people make accumulated somewhere in one record system.

Here we come to the crux of the concept I have in mind by which data automation might provide the means of supplying the services apparently needed. One is the maintenance of a central record of all classification determinations in DoD operations. Because of the tremendous scope of DoD interest and the complexities resulting from trying to accumulate in one central point literally thousands of classification determinations in such a way as to make them readily searchable and useful, only data automation seems to provide a possibility of solution.

A review of some 70 or more classification guides and guidances issued by the military departments reveals startling differences in approach and in results. Here I must give the Air Force credit, particularly in the Air Force Systems Command, in arriving at a desirable uniform format and content for their master classification guides.

From this review I listed some 300 or more items that someone, somewhere, at some time, had considered

for classification purposes. In my own fumbling fashion, I attempted to categorize those items. I believe this is probably the first faint step along the way to development of appropriate computer language for the concept I have in mind. I have placed these classifiable items in 19 groups. There are three or four of these groupings that actually comprise the heart of the classification problem. They are: specifications, capabilities, performance and maybe operations. For whatever they are worth, copies of this listing can be made available.

Here I must emphasize a very important fundamental of classification. It is *information,* and only information, that is classified. (One of these days I hope to find time to write a paper for our *Journal* that will help to crystallize and sell this idea.) All physical things, documents, cards, tapes, hardware, equipment, everything like that, are classified only because they contain or could reveal classified information. Some other time we can argue the universality and totality of this fundamental of classification. It is basic to the concept I am considering.

The listing of items I have prepared is not complete in that, I am sure, it does not cover all the many items of information involved in DoD operations that may require classification. One of the first steps that would have to be undertaken would be to develop a complete dictionary or thesaurus of terms expressive of items of classifiable information. This compilation would have to cover the entire field of DoD interest and activity.

This compilation would form the heart of a computer language system from which, by proper memory arrangement and programming, a computer operation could be developed that would provide ready, quick answers as to what is classified, at what level, in every phase of DoD operations and activity.

In this system I envision maybe three or four descriptor fields. First, a general field of interest group — broad, something like the 26 descriptor groups in the DDC thesaurus. Second, a listing of the kinds of information most frequently involved in classification decisions. Third, a categorization of kinds of hardware that are sufficiently general to apply in many fields of interest. And a possible fourth category of descriptors covering miscellaneous things, like financial records of various kinds and other software items that frequently contain and reveal classified information. So far as I know, none of these descriptor fields or groups have been stated in a manner that can be used immediately for classification control purposes.

Items of information, like the destruct frequency of an operational ICBM, the composition of a highly developed unique material, or the thermal resolution obtained by an infrared mapping system, and the many thousands of similar items would be reported by the responsible classifying authorities on each program, project, study, items of equipment, and munitions, to a central data bank. I do not mean that the particular frequency or the exact details of material composition would be reported, but only the items of in-

formation that are classified would be reported. The information reported would then be stored for immediate retrieval. The parallel sets of descriptors that I mentioned would serve as the storing and indexing system.

From my choice of language you can see that I do not fully comprehend the scope of the machine problems involved. Perhaps even the fundamental concept I am trying to portray is archaic in terms of today's computer capabilities. Nevertheless, this is one concept of data automation for classification control. It would be a computer system that has accumulated in one place every possible classified item of information involved in every DoD activity, maintained in such manner as to provide at computer speeds answers to all kinds of questions on classifications assigned. This system could be made to perform these functions:

Provide promptly accurate data on what is classified, at what level, and what is unclassified, in every DoD system, program, project and operation. This would speed up the Security Review process measurably.

Keep tabs on downgrading and declassification actions.

Provide a means for identifying information previously classified that is declassified because of official publication, and for sending out notices to all interested parties.

Assure uniformity in classification determinations in like activities in the same DoD component, in different DoD components and, possibly, in different Government agencies.

Identify offices and officials who have cognizance over classification determinations that should be changed because of changes in contributing factors, such as open publication, official pronouncements, intelligence, etc.

On call, provide the basis for writing classification guides for new programs, projects and operations.

All this sounds like a wonderful idea but there are many very practical problems that could easily defeat the successful operation of such a mechanism. Probably the most significant problem stems from the fact that the decision-making process is not susceptible to centralization. Therefore, failure of the necessary reporting system for any reason could ruin the operation — whether because the reports are not timely or not forthcoming, or the decisions are not in the proper format for adaptation to computer language, or if the decisions are in terms of classifying hardware and not information.

There is one other prospect that might make this concept more feasible. The decision-making process and classification control could possibly be centralized in the Centers for Analysis of Scientific and Technical Information. These Centers, 22 of them the last I heard, were established by ODDR&E under the DoD Instruction 5100.45, July 28, 1964. They are primarily for the purpose of accumulating for selected scientific disciplines every possible bit of data, analyzing the state-of-the-art, both open and secret, foreign and domestic, and presenting reports thereon to eligible interested parties. With this kind of

concentrated knowledge in specific scientific disciplines, it would seem that those centers would be in a very good position to make, or at least to monitor, security classification determinations in those disciplines. Consequently, it is possible that those centers could provide for those scientific disciplines the services I mentioned.

This whole thing is, of course, contingent upon a showing that the net values to be achieved from the centralized computer operation would be sufficient to warrant the cost of establishing and operating it. I don't know whether it is but it seems as though it might be. I don't really know enough about data banks and retrieval systems to understand just what kind of a computer problem would be involved. Feasibility of the thing would have to be established. Inherent in the decision to go ahead is the primary element of cost in terms of equipment, manpower, and time. Accumulation of all the data I am thinking about also could raise all kinds of security questions, mechanical to be sure, but serious.

LORRY McCONNELL: Thank you Don. Our next speaker is one of the very few I have been able to discover in the technical area who has devoted attention to our security techniques in the computer environment. He has very graciously consented to be with us today and fortunately was able to make it from Pennsylvania. I refer to Mr. Harvey Bingham. Mr. Bingham was born in Cleveland, Ohio. He received the B.M.E. degree from Rensselaer Polytechnic Institute in 1953 and M.S.E.E. degree from Drexel Institute of Technology in 1959. He is a Ph. D. candidate in Systems Engineering at the University of Pennsylvania. From 1953 to 1955 Mr. Bingham worked on a prototype integrated air defense system while in the U. S. Army Signal Corps Engineering Laboratories. From 1955 to 1959 he was employed by the Martin Company where he performed test planning, field testing direction and evaluation of the Missile Master system, reconnaissance studies, and systems analysis of the Titan ground support equipment. In 1959 he joined the Burroughs Corporation in Pennsylvania. He is presently a Senior Engineer in the Advanced Development Department. His early responsibilities included data processing for airborne antisubmarine warfare. He developed and programmed performance measures for message switch evaluation and analyzed methods for achieving security through modularity and common user communications networks. He was the project engineer on a study of combined hardware and software security techniques for EDP of multilevel classified information. His recent effort has been optimizing task scheduling and resource allocation in general parallel-processing and multiprocessing computer systems. He is currently principal investigator studying implicit computational parallelism with object for a formal basis for a parallel compiler language. Mr. Bingham is a member of the Association for Computing Machinery, the Institute of Electrical and Electronic Engineers, and the Scientific Research Society of America. It gives me great pleasure to introduce Mr.

Harvey Bingham, presenting a paper by himself and Mr. P. K. Sorensen, "Security Techniques for EDP of Multilevel Classified Information."

HARVEY W. BINGHAM

Safeguarding multilevel classified (need-to-know) information in a single, highest-level classified electronic data processing (EDP) system may be accomplished by a combination of hardware and software techniques. Safeguarding must prevent access beyond authorization in spite of possible hardware malfunctions, and at the same time impose minimal operational impediments to authorized user activity.

Fail-safe assurance requires that no system user can have access to information for which he has no need-to-know, nor after his successful identification to the system can he modify the system beyond predefined limits.

User interaction with the EDP system is assumed through terminal units in a private secure work station. Identification of a user to the processing system yields an EDP-readable proxy (the user's control profile) to the set of security and need-to-know control code names grouped by allowable processing activities. This user's control profile is pre-established by the system supervisor to be sufficiently flexible to permit the user to do his work. A user's control profile defines the allowable access and processing for the work station through which the corresponding user identification has been made.

The following assumptions have been made in this evaluation of EDP security techniques:

1. The electronic data processing system has a multiprogramming and multiprocessing capability, and includes remote on-line consoles.
2. The system operates under an executive control program (ECP) which assigns hardware to user programs and performs security-related operations.
3. Each system user has a uniquely defined security clearance and need-to-know classification limiting access to the programs and data base (user's control profile).
4. A personnel identification technique exists which relates the current user of each equipment to the system (a physical card or user's key for activating the user work station).
5. Security techniques should have only a nominal cost increment for new system design; some techniques should be applicable for retrofit.

In regard to physical configurations, most present EDP configurations batch a group of programs for processing. Programmer and operator are intermediary between user and hardware. Job turnaround time is generally measured in hours. Thus, each job processed at user request tends to be large, with bias toward retrieval of too much information processed in too many ways, often resulting in extraneous hard copy output from which the user selects the part that is pertinent. The security protection principally resides in physical control and single common personnel security clearance.

An evolutionary approach to re-

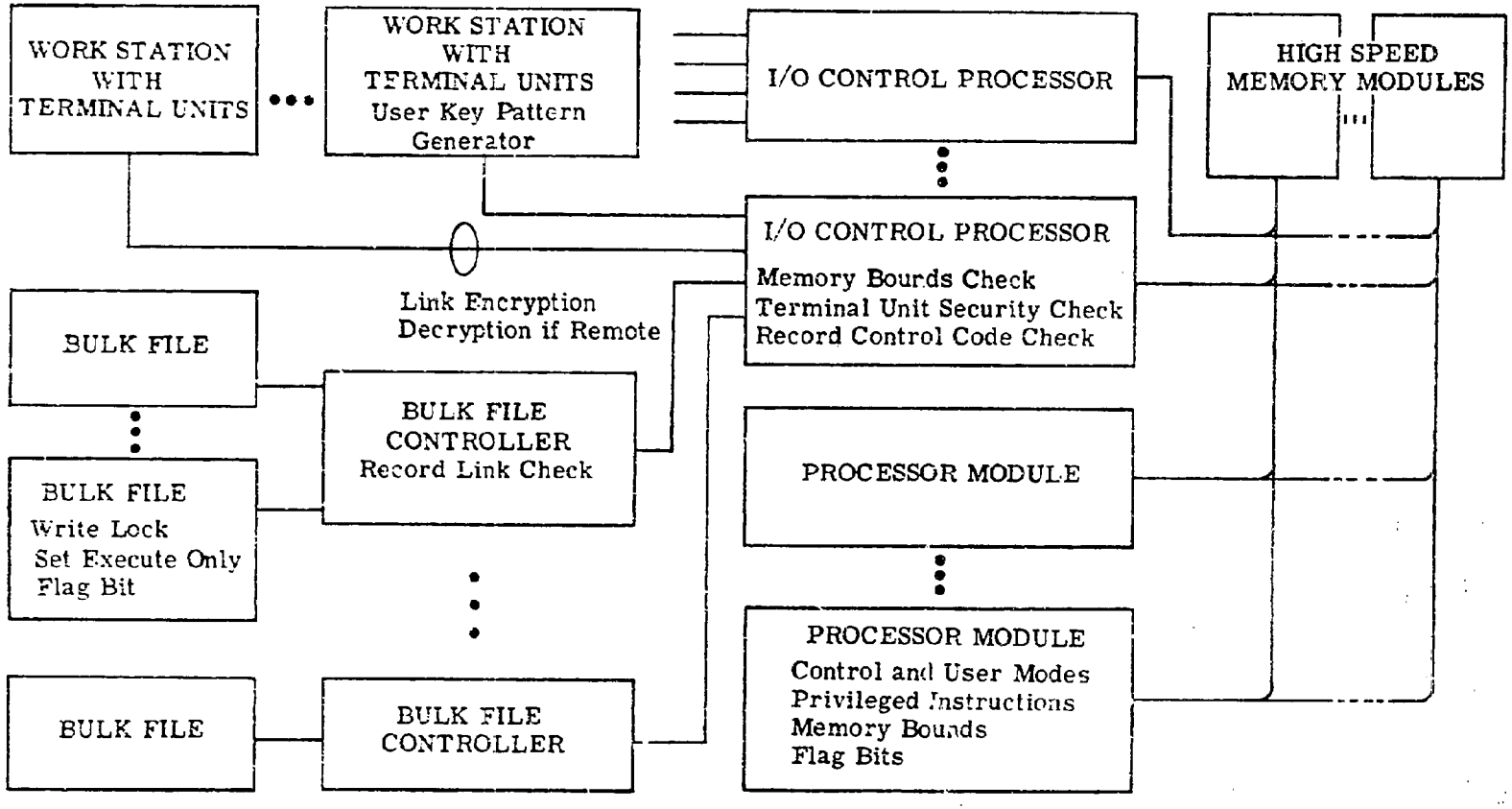

Figure 1. General Multiprocessor Diagram Showing Security Additions

duce the turnaround time provides users with on-line consoles serviced by time-sharing (not high-speed memory space-sharing) the data processing equipment, plus suitable backup batch processing workload when no on-line demand exists. In general, any access to file directories is protected by control codes associated with data or program entities, user's control profiles, and equipment security profiles.

Another modular processing configuration, representative of systems of apparent future development, is suggested in figure 1. Special purpose processing equipment is minimized, data interfaces have common characteristics, and sufficient quantities of each type of unit are provided to fulfill the system demands (two of each are shown).

Physically secure user work stations include terminal units for use by one user at a time. Muliple bulk files are accessed by controllers through I/O control processors into sections of a high-speed memory, assignable as needed. Multiple processors operate under a common executive control program (ECP) which allocates equipment and assigns jobs. By such dynamic ECP control, the available processing power can be applied to the multiple jobs which provide the current demand for service.

Many hardware features common to such modular systems are available for assuring job separation, and have direct applicability to security control as well. Some of these hardware features are:

1. Processors have both control and user modes.
2. A broad set of interrupt conditions exist from both internal and external sources.
3. Memory bounds registers provide protection of the ECP and its associated service programs and control tables from access or alteration by user programs, and also keep user programs and data separated while allowing concurrent presence of information for multiple users in the high-speed memory.
4. Privileged instructions for setting special registers and input/output control are executable only by ECP direction in control mode.
5. Flag bits appended to memory words are usable for identification of word type and for interrupt, or other control purposes, independently of the data content of the memory words.
6. Input/output units require feedback confirmation of proper connection, both with internal memory areas and terminal units, prior to data exchange initiation.
7. Multiprocessing and multiprogramming with interrupts require program relocatability; i.e., it must be possible to set jobs aside and resume them at arbitrary times on possibly a different hardware set.

Additions to existing processor, input/output control processor, bulk file controller, and bulk file of about 10 percent extra hardware can provide significant security enhancement.

A processor module has basic arithmetic and control capability and op-

erates on words or characters. Parity generation or checking is provided on all memory accesses. The processor has two modes of operation with the control mode entered through the maskable interrupt system. It includes flag bits for word content control while in user mode. It has privileged instructions usable only in control mode, and it includes multiple memory bounds registers providing comparison for all memory addresses to restrict user program access to only those memory addresses previously verified as necessary for that user program.

Processors of apparent future development have multiple modes of operation differing in the capability of processing instructions available and possibly in memory access restrictions. The modes may be separated into at least two groups, control and user, differentiated by the setting of a redundant set of flip-flops.

In the control mode, the full instruction set is available, including both unrestricted and privileged instructions. Privileged instructions include those that control input and output, and interrupt mask register loading.

In the user mode, only the unrestricted subset of the available instructions can be executed. Any requirement for a function performed by a privileged instruction is fulfilled by a call on the ECP. Should a privileged instruction occur in a user program, it is treated as illegal and results in an interrupt transferring control to the ECP. The processor responding to this interrupt is placed in the control mode, the interrupt is interpreted by the ECP and results in execution of the necessary control action. Proper completion of this control action is a prerequisite to executing the privileged instruction desired by the user program.

Programmed entry into control mode is only by an interrupt specified in an associated mask register. Any programmed attempt to circumvent the interrupt entry is prevented in normal operation by physical lockout of access paths. The mask register and the ECP base program address register are similarly physically protected. These precautions provide assurance that the control of interrupts is initiated as expected by the ECP. Programmed exit from control mode back to user mode is accomplished by executing a return to user mode privileged instruction.

Flag bits in memory words are used for control purposes rather than for actual user processing. As such, they are not alterable by the user, but are inserted by either special physically unlocked switches, or by the ECP, or may be created by hardware alone. The most significant possible applications of flag bits for security protection are:

Parity—Generated by all units preparing information for transmission and checked by all receiving units; provides error detection.

Execute-only — Used to identify and protect from alteration the ECP and service programs.

Memory bounds load – Indicates a memory word from which a user's program can obtain settings of memory bounds registers about an

area previously allocated by the ECP to it.

Security label—Used as a classified-unclassified indicator.

Privileged instructions are the ones that a clever systems programmer needs to defeat system control residing in the ECP. The requirement of a control mode signal as input as well as recognition of unique operation codes to permit executing privileged instructions provides redundant assurance that these will be unavailable to user programs (including unverified systems programs). Privileged instructions include: Input/output command descriptor establishment used by the input/output control processor to control information transfer, flag bit setting on memory bounds loading information, interrupt mask register control, interrupt response base address loading, mode control register resetting to return to user mode.

The combination of memory bounds registers with a fail-safe control program is the recommended means of providing memory access control. In the assumed multiprogramming-multiprocessing environment, floating programs are necessary to permit dynamic memory allocation for space-sharing of memory among multiple concurrent users. All memory accesses required by a user program should be verified as within memory bounds.

The first type of memory bounds register bounds the user's program reference table. Within these bounds a user's program may reference by indirect address the arbitrarily allocated objects required by the program. Such a reference allows access by the user's program to the base address of the named object area and thus, internal entry access by indexing relative to that base within the bounds associated with that area.

The second type of memory bounds register indicates the access permissible in a particular memory area. The types considered are: execute only—for program strings, read only—for data tables that are to be referenced but not altered, and read and write—for working data storage. Two bounds register pairs of the second type are required, one for the program string in process, and one assignable to either of the data access types. Determination of which is to be loaded is a function of the hardware and the program reference table (PRT) entry resulting from the instruction making the indirect address call. Rather than provide a separate set of memory bounds for the ECP, the ECP program words are identified by normally unalterable execute-only flag bits.

No special security features are recommended for inclusion in high-speed memory modules. Parity checking is presumed as part of normal design on received addresses and data for writing into memory, as is parity regeneration and checking on memory reading.

An input/output control processor (IOCP) provides the data flow and control interface between the high-speed memory modules and the peripheral units (either terminal devices in a work station or bulk file controllers). The main function of this interface is to ensure the integrity of the data and the routing between its proper source and destination. An

IOCP is a limited capability, special purpose processor. Its program control instructions are descriptors prepared by any processor in control mode and received via any memory module. IOCP control functions include receiving, repeating, or generating control signals between or for the peripheral units or one of the processors (executing the ECP). The normal functions include fully buffered independent access with memory modules, peripheral units selection, connection verification, interrupt generation or relaying for processor notification or servicing, and data transfer buffering including both rate and format matching for a variety of types of peripheral units.

Memory bounds are required as part of each descriptor to ensure all addressing is proper. Security comparison is made of the control code in a descriptor in the I/O memory with the control code of a physical record read from a bulk file. Comparison is also made of a user's key pattern with its terminal unit.

The unit maximum security level allowed by physical security considerations for any exchange from a terminal unit is checked against the security part of control codes to assure no release of more highly classified information than permitted. The maximum unit security level indication is wired-in and not changeable under program control. In this form the IOCP provides a redundant hardware security limit check which is independent of any performed by processor hardware or software. In a system which is computation-bound rather than input/output bound, the memory blanking and checking responsibility required before memory reallocation can be included in the IOCP to relieve the computation burden.

The work station for a user contains a group of one or more input/output terminal devices plus a user's key pattern generator in a physically secure enclosure. Only one user at a time is allowed in a work station so that the security controls necessary to restrict access to that user (his user control profile) can be taken as restricting information exchange with terminal devices in the work station. The user's key pattern initiates user identification-authentication, and verifies user presence before allowing classified input or output. Insertion or withdrawal of the user's key initiates an interrupt that changes the work station status.

The bulk file controller serves as an address and buffering device for transfer of a physical record between the bulk file and the connected IOCP. It receives control commands that include file addresses relayed from descriptors in the IOCP. The bulk file controller appends a sequence indicator at the end of each physical record written into the file. When later read this sequence indicator verifies that the physical record is the one addressed, that it is read in its entirety, and that no alteration has occurred.

Each storage section of a bulk file may be protected from alteration by physically disabling the write circuits. A security feature that could be added to the bulk file is a locked compartment within which are write-dis-

abling switches and the means for setting the execute-only flag bit for each word of those physical records that contain the executive control program. This would be the only way to set the bit and thus identify the programs as able to be run in control mode.

In regard to software security techniques, the executive control program (ECP) provides the structure within which security routines and techniques are applied. Addition of security protection software to the ECP represents about a 10 per cent increase over that normally required for a multiprocessing-multiprogramming ECP.

The ECP implements and controls the multiprocessing and multiprogramming capabilities of the system and provides security safeguarding as well. The ECP provides the user with the action needed at each point in his job processing. A series of tables and directories is required to keep track of user jobs and the operating system itself. These tables and directories reside in protected memory and are only available to the ECP. Most important in this discussion is the program reference table (PRT) which contains the name for each object referenced by a program, and memory area assigned by the ECP, not the programmer, including memory bounds.

In addition to the tables required for the ECP, three tables are provided explicitly for security control — the control code name table, the system user table, and a set of user control profiles, one per user. The control code name table provides information for transformation between control code and full English control code name. The system user table provides the file name or high-speed memory address of each user's control profile. A unique user's control profile exists for each user of the system. It provides the information necessary to identify and authenticate the user and to associate to that user the security classifications and need-to-know authorization deemed necessary by his supervisor for effective performance of assignments.

The user's control profile is in a read-restricted and write-protected area of memory. Reading is restricted to an ECP-called I/O service program. Alteration of any user's control profile is done only by an ECP-called service program that has its access protected by a control code unique to the system supervisor. This program is usable only by that user's supervisor, who must also gain system access through an identification-authentication procedure, and who has write access to a control code reserved for his use only. If this degree of access control is inadequate, it can be coupled with a properly identified second person (possibly the user himself) who must concur in the supervisor action.

For control of user production jobs, all requests for programs and data must be processed by the ECP. At job production scheduling for a user (not program preparation), the user's job is assigned and the skeleton program reference table (PRT) for the requested job is assigned a PRT area. This skeleton is complete except for actual locations and the presence indication for each entry. The ECP ver-

ifies the right of the user to have access to the desired information program segments and data blocks named in the PRT by checking the control code of the named information in the system directory against that user's control profile. If the request is approved, the ECP first allocates memory space, enters the assigned base location (and computed upper limit) for each named PRT entry, obtains the required programs and data from the bulk or other storage, and places these information entities within the high-speed memory. The ECP then checks the header contents of each retrieved data block for control code against the expected control code (and possibly data block name or block number). If this check is satisfactory the corresponding PRT entry is marked as present in high-speed memory. Some or all of the memory bounds registers may also be set by the ECP at this time. The computer, after verifying that everything has been set up correctly, initiates the user program.

For a user to manipulate the EDP system by his programming action, he must: know its operation, organization and security protection techniques, gain access to the operating system while in process of controlling this system, and recognize and successfully avoid execution of all subroutines which can detect, log, or abort his manipulation.

Protection can be provided to prohibit a user's manipulation of the system by dividing the operation, organization, and security protection techniques into parts, by preventing access to the operating system through making memory bound registers fail-safe (the program does not depend upon the bounds registers for limiting addresses), and by random insertion of program challenges in a program string to force knowledge either of the proper responses (as would be available to an authorized user of the program) or interpretation and avoidance of such segments of a program string.

Logging provides some measure of after-the-fact security control. What logging is required is an administrative decision. Assuming that a system log is required, it should keep a running log on each user's requests and the responses to these requests from the data base. Log information can be separated into multiple records with different control codes available only to different supervisors. This diffuses the log analysis responsibility among multiple supervisors, so that cross checking can be achieved.

The security protection provided by ECP must be fail-safe, that is, information processing should be interrupted at any detected hardware malfunction or at any programmed attempt to transgress permissible security bounds (or alter them in any unauthorized manner). Thus, at each major step in the information processing, positive action must be taken to permit initiation of the succeeding step. Each positive action is a specific check that must yield the corresponding specific response; otherwise, the process is interrupted, and the failure (presumed) or forbidden action request is investigated.

A single thread example of security safeguarding during system startup

and use illustrates the application of the previously described techniques. Figure 2 is a summary flow chart of user's job control by the ECP indicating the supervisor's role in system startup, the user's identification and authentication, and the ECP control of input and output, memory allocation and privileged instruction execution.

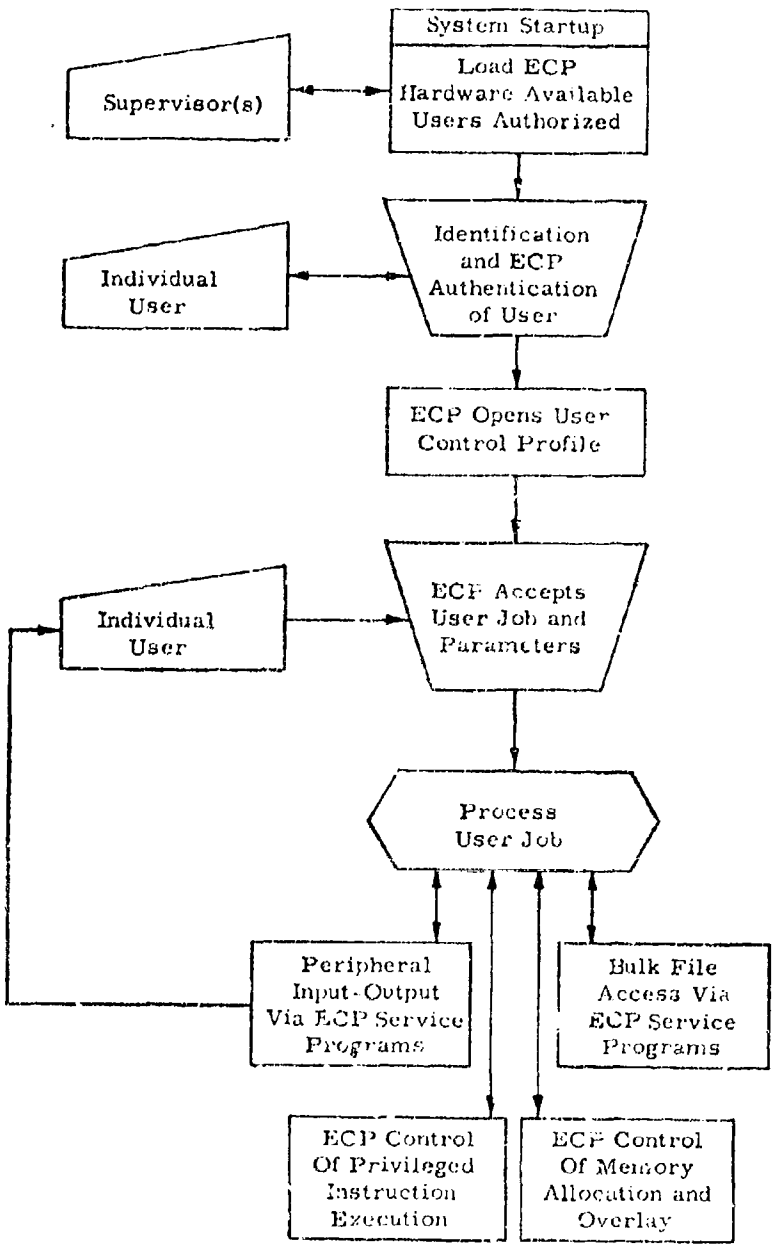

Figure 2. User Job Flow Control by ECP

The ECP accepts supervisory interrupt from a peripheral device to enable setting up the user's control profile tables for other currently allowable users. The originally-loaded ECP contains a routine which can only identify supervisors. The ECP interrupt response initiates the authentication sequence corresponding to that supervisor's key pattern. Satisfactory completion of this authentication opens the supervisor's user control profile. That supervisor activates entries in the system user table of identification authorizations for the users he supervises (as allowed by his control profile) and who currently require system access. At completion the supervisor receives an output confirming the users whom he has currently authorized and a log record is made of this action. When satisfied, the supervisor releases the ECP and effectively opens the system to the other users now authorized.

Control of a user by the ECP starts when a user inserts his key in a key pattern generator at a work station. The resulting interrupt is used to relate the user to the work station and its included terminal units and to identify the user's control profile. When the profile is available in high-speed memory, authentication responses from the user are matched against the expected responses in the user's control profile. Successful matching activates the user's control profile, and an "open" indication is made in the system user table. An opened user's control profile provides the control codes authorized for processing information for the user at that work station.

The identified and authenticated user initiates a processing request from his work station by a suitable interrupt. The IOCP forwards this interrupt, now identified as to unit and user key pattern, to the processor module responsible for this interrupt. The processor enters control mode and the ECP sets up and bounds sufficient memory areas for buffering input messages from the user terminal unit and prepares necessary descriptors to allow the IOCP to control the further processing input. Upon completion of sufficient input to specify the desired user processing, if the control codes of data or program entities are included in that user's control profile, the processing is initiated.

References to program data, and working storage blocks are handled indirectly through that user's PRT. Thus the pre-established memory bounds (including allowed use) contained in the PRT entries are available for reloading memory bounds registers prior to any user program addressing into a block. Flag-bit protection of such a PRT entry assures that the content can only be used for bounds reestablishment.

Instruction address comparison against memory bounds registers confines instruction execution to the user's allocated execute-only areas. Data or working storage areas may be read-only or both read-and-write access protected by bounds registers for the user, as determined by use indicators in the memory bounds register.

All I/O requests are directed to the appropriate I/O service program executable in control mode only. In this discussion, I/O is considered as view-

ed from the ECP and high-speed memory. An area of this memory receiving an input record remains unavailable to the user until its control code is checked against the user's control profile. Once this area is released to a user program, processing of its content should be unrestricted until an output attempt is made. Control code alteration (through its control code name) is necessary in the legitimate execution of the user's function (i.e., reclassification). To prohibit this alteration restricts the user unnecessarily. A reasonable limitation is that a user may alter the control code, restricted only by the presence of reclassification permission on the new control code in his user control profile.

At the time for output, the user's (output) control profile will determine the acceptability of the output request. This includes ensuring that the control code placed on the output record is within the user's output control code list.

Depending upon the level at which retrieval information is entered, requests on the data base for program or data records may have several types of checks imposed. At the first level, file index key words, a user may be restricted to certain key words or classes of key words, defined by control codes in the user's control profile. The second level, retrieval identifier (or file address) of each information record described by the key word, requires the identifier to include the control code of the desired information so a check can be made with the user's control profile to see if the retrieval is allowable.

These two types of checks are made on items that are separate from the actual data being protected. If either of these checks fails, accessing the information is not permitted. The retrieval system, once it has the address of an object file, accesses the data base (bulk file) through the IOCP and bulk file controller for the required information record.

At I/O-complete interrupt, some information in response to the request is in high-speed memory. A memory bounds check on the transfer addresses assures that it is in its assigned input area. Prior to release of this information to the user's program, the access is logged and a check is made that the control code contained in the header of the information itself is in the user's control profile. Another check is made to ensure that the information control code matches the control code associated with the address contained in the information retrieval system. Any hardware malfunction altering part of these would be detected, and any undesired information release would be prevented.

Output to the data base in the bulk file first compares the control code of the data with the user's control profile to see if the requester is permitted to make such an output request. If this check is successfully completed, the data is released to the information storage program.

An input request by a program on a terminal unit (for example, read card or read console buffer) will have several levels of check imposed before the requested data is released to a user program. A file header will precede each file. This header will have either

the control code name or the control code of the file which must correspond with one in the read part of the user's control profile or the request will not be serviced, and appropriate administrative action will be initiated. Completion of this check opens this file to this user.

Only after the file is open will records in this file body be accessed by the ECP. Each record has a control code name in its body or a control code in its header. The record control code must be in the user's control profile of the requester or the data will not be released.

Output to peripheral device includes two checks: the user's control profile contains the control code of the data to ascertain that the request is permissable, and the security level for the peripheral equipment includes the security part of the control code of the data to ascertain the equipment qualifications for handling the data. The output program passes the descriptor of the output request to the IOCP for executing the output.

Requests requiring prolonged processing can be left in process; however, any output to a work station is withheld until the intended user is actually at an output station and has properly identified himself. If the output is too bulky for conveniently storing in memory, the appropriate I/O service routine will create a file on disk or magnetic tape with the same security protection by control code as any other file in the system.

When the ECP determines that a user's assigned areas must be overlaid for another user, or when a user program terminates (is finished with an assigned area), the memory-overwrite-check security routine of the ECP will blank out the area and all registers, table locations, etc., associated with it. A positive check on the blank-out procedure will be successfully completed before the areas are reassigned.

Placing security protection trust in the ECP requires that it be made invulnerable to surreptitious alteration. Thus, safeguards are required on penetration of the ECP.

The system programmer may prepare and debug a program that will eventually be used as part of the ECP or as a service program. This program is executed in user mode and has a control code name indicating its eventual purpose. Such a program will no doubt include privileged instructions. Attempted execution of a privileged instruction will interrupt the program. The ECP will interpret the interrupt, identify in that user's control profile that he is permitted to prepare a program having potential ECP use, and provide interpretative execution of that privileged instruction using only unclassified information in response. In order to use this unclassified information, it may be necessary to substitute names or addresses for those used in the actual attempt. The system programmer, to minimize his uncertainty in the result of interpretation, should supply suitable unclassified material himself. If the program performance depends upon control code recognition other than unclassified, one can be selected from a simulated classified control code set. One unclassified record for each such simulated control code can

be included in the data base. These simulated control codes can be chosen to have all distinctive security levels, and can be included in each system programmer's user control profile.

Upon the system programmer's satisfaction that his new program is ready for addition as a part of the ECP or as a new service program, administrative permission must be obtained from a system supervisor for inserting this program. In order to actually include this program, the supervisor opens a physical lock in the bulk file hardware. Within this unlocked compartment is the switch to release the write lock on the area of the bulk file in which these control programs are kept. Also in this area is the switch to set (at program write time) the control flag bit on each word denoting control program.

Thus the supervisor decides and enters any new control program only after having been satisfied by the preparing system programmer that it does function as intended. To execute the new program, the write lock must be restored, the compartment locked, and the program read into high-speed memory with flag bit now properly set for execution as a control program.

The ECP and its service programs are operated by using a set of tables and directorates which contain pertinent configuration and work demand information for the user programs to be run. In addition, a PRT is created for each user. The required tables are established by the ECP, executable in control mode only. The integrity of the tables is preserved by only the one PRT for the current user being within the PRT memory bounds when outside of control mode. All other tables and the ECP and service programs as well as all memory areas assigned to others users' programs are restricted from the current user by memory bounds registers. All memory areas in these tables privately allocated to a user for data or programs are verified to be unique to the user. Thus, the ECP cannot be violated through indirect addressing via these tables.

In summary, the recommended techniques provide assured security control by restricting user access to those data or programs for which he has security clearance and need-to-know. This restriction is achieved by memory "base" control established by an inaccessible executive control program which, in turn, provides checks of each memory access against hardware memory bounds when user programs are executed. The ECP is protected against tampering by physical locks. Only the ECP assigns hardware, allocates memory including memory bounds to confine user programs, and establishes all inputs or outputs. Each information entity (program or data) has a control code which is checked against the requesting user's control profile prior to release to the user's program. This check is performed by both the ECP and the input/output control processor. The IOCP establishes and confirms connections to peripheral units, addresses memory within memory bounds, and performs security checks against header content of records transferred. Bulk file control assures integrity of accessed records, and permits write lockout and

flag bit setting to protect the control program.

For modular multiprogramming multiprocessing systems of apparent future development, the hardware techniques suggested for security protection represent about a 10 per cent increase in EDP hardware over that necessary for the basic processing task performed in a multiprogramming, multiprocessing system with on-line users. A corresponding small increase in memory is required for security routines and tables. The individual execution times for security routines are small compared to the ECP routines within which they are imbedded. Most of the techniques are suitable for retrofit to present systems.

McCONNELL: Thank you very much, Harvey Bingham. I recall a statement of one of our scientists that those of us in the classified field and those of us in the technical field can and ought to attempt to create a dialogue with one another. I for one am going to go back and read that again. There is a wealth of information there.

Our final speaker today, Mr. Charles Buckley, is another one of those rare individuals, at least of my experience, who has considerable store of technical knowledge to convey to us. As an associate of the Bell System, Mr. Buckley has many examples of application for mass data handling which I am sure can inspire us to find comparisons and perhaps applications in the security classification field. Mr. Buckley is a native of Detroit, Michigan. He is a graduate of the University of Detroit where he majored in economics. He has worked in the Bell System for 23 years. The past fifteen years he has been actively engaged in data processing activities. Mr. Buckley was a staff supervisor in the Systems Research and Development Department at the Michigan Bell Telephone, where he worked on early EDP applications using the Univac File Computer, the IBM 7074 and the IBM 1101. From 1961 to 1963 he worked for AT&T on a pilot project using a large scale computer for the mechanization of revenue accounting work. Since 1963 he worked for the Chesapeake and Potomac Telephone Company in Washington, D. C. Currently he heads the Chesapeake and Potomac Telephone Company's Data Processing Methods Division. It is indeed my pleasure to present to you now Mr. Charles Buckley, speaking on mass data handling in the Bell System.

C. P. BUCKLEY

The mass handling of data is not new in the Bell System. We have been successfully coping with this problem for many years. However, we are near the saturation point today.

The Bell System had nearly 76,000,000 telephones in service at the end of 1965. Our customers generated 266,000,000 local calls every day. In addition, they used our long distance service over 13,000,000 times every day last year. These same customers requested changes in their basic service 50,000,000 times in 1965.

The Bell System operates this empire by employing close to 800,000 people. Our share owners have invested close to $28,000,000,000 in the equipment needed to serve our customers.

This will give you some idea of the magnitude of the problem. Conventional means of handling data, such as clerks in the early days, followed by punch card equipment after the war and modern batch type computers since the middle fifties, are no longer adequate to serve the needs of our growing dynamic business.

For the last five years, the System has been developing new approaches to cope with the ever increasing volume of business. We call our new approach the Business Information System. The new generation of computers is now available to make B.I.S. possible.

Let's talk about the development of a Business Information System in the telephone industry and what we expect of it in a few years.

We've been using computers in the Bell System for fifteen or sixteen years, but the early computers didn't have the kind of sophisticated capability they have today. So we used them originally to attack our work in piece parts — mechanizing operations individually, where it was needed most or where we could conveniently do it.

Here was one of our big volume headaches, sorting toll call tickets by the millions. Every time anybody made a toll call the operator wrote all the details down on a ticket. These all came to us in a random fashion and we had to sort them down by hand in telephone number order, and by date order, and in all sorts of other ways required of good service. We're talking about 163,000,000 of these things every month. This offered us a fantastic opportunity because sorting is something that big computers did extremely efficiently.

However, we still had to rate each ticket manually. A girl had to take the call record and see how many minutes it lasted, between which two cities, then she'd look into a very complex rate schedule and write down the correct amount, and ultimately it would get on your bill.

Then this machinery came along. It was not a very elegant operation by today's standards, but it could do the entire rating and billing job. Incidentally, this was a vacuum tube calculator, and we had to install special air conditioning just to take away the tremendous heat it created. In fact, some elegant engineering used these early machines to help heat the buildings. It was kind of an odd way to do it, but some of these things threw off enough heat that they actually reduced the load on the furnaces. Still these were very high class data processing systems, and people even wrote learned theses about them.

You know, the pace of this technology is incredible. We have a fellow in our department who said the other day, "In the good old days, we used to do thus and so." The good old days were about seven years ago for him, and he was talking about what are already old style methods. Today's pace of technology is characterized by the anecdote that says that if the Americans invent something today, two weeks from today the Russions will claim they invented it a year ago, and two weeks from then the Japanese will be selling it at half price. Now that kind of a world is really a vicious one in which to live, and the people

in the computer area expect this kind of development.

Well, what we had in effect in the old days was a big Chinese puzzle, and with the computer capability available then we could only attack parts of the puzzle. You saw attacks in these various areas: market management statistics, the big billing and collecting job I've been talking about, trunk estimating (a really rascally tough problem of where do you put your facilities and how do you connect them up), outside plant records and studies, and directory. And we had service orders, personnel statistics, property and cost. We had to attack every one of these things in an isolated way. And other businesses using computers had the same kind of experience.

The fact is of course that all these jobs we've been doing are interrelated parts of a total picture. Today, with the new generation of computers and the communication network, we have a way of attacking this as one vast, interrelated system. Now at this point, I'd like to give you just one personal anecdote, a story that's told by Hank Boettinger, our Assistant Comptroller, that illustrates how your attitude towards data processing and change will dictate how things go if you're involved with them.

In the middle of World War II, down at Fort Meade, there were a bunch of characters from MIT and Cal Tech and like places — the horn-rimmed short haired types who were really going to win the war with technology. And they were put in charge of an old-time sergeant who chewed tobacco, and had a leather strap around his back and a campaign hat, and he said, "Now you men are supposed to become officers," and he said it as though the Nazis had a tremendous edge. And then he said, "Anybody of you," and he spat in the dust, "Anybody of you who becomes an officer in this here Army has got to 'earn to use this here sabre." And these G.I.'s thought that was something because they were going to win this baby with technology and all that. The sergeant says, "Now, any of you smart guys know why this here sabre is curved?" And there was a kid from MIT named Kiefer in the back, and he said, "Yes, Sir." "Don't call me 'sir,' sonny," the sergeant says. "What's your reason?" Kiefer says, "Due to rotary motion of the human arm, it is necessary to get the maximum shearing stress when the object to be cut . . ." He gives a five minute lecture on mechanics, on the shearing stress, the history of the scimitar from the Crusades on, and the sergeant stands there spitting pints of tobacco into the dust, and finally he says at the end of this very erudite lecture, "You're wrong, Sonny, this here sabre is curved so it will fit into this here scabbard."

To some extent, the way people organize operations, you go around and ask them why we do this or why we do that, they'll give you the kind of answer that the sergeant gave. We have to fit things into the scabbard. We have to fit it into the kind of paper work systems available. This is what we had to do in the early computer days. Now we're trying to avoid that scabbard type of restriction. And I think we can.

Well, it was a great accomplishment when we put all the information about toll calls on punched cards, and it took us about ten years to get this kind of a system in. But then people began getting dissatisfied with it because pretty soon we had this kind of a problem: here's about one day's toll tickets for one office's long distance calls; it has obvious limitations; it takes up space and it's tough to find any one of those cards you may want.

So we moved up to magnetic tape. This is a very cheap, highly dense, compressed storage. But you'll notice it has the same disadvantages the Egyptians had with their papyrus scrolls. If you needed something that was in the middle of the papyrus you had to be a pretty fast man with the scroll. We have the same problem with tape; you can't get at whatever you want quickly enough.

All right, we don't like magnetic tape. We'll do something like the fellow did when he tore his papyrus into pieces and made the first book (which, by the way was one of the first large volume random access devices). Only we'll cut our tape up into short lengths and paste it on an old drum. On this kind of a drum you can put about 130,000,000 characters of information, you keep the drum rotating constantly, and you can access it, pick information off it, in about 1/20th of a second. And you can have this even though you're miles away from this central storage machine. All you need are telephone circuits to connect you to the computer. That's where communications comes in to give this data processing real significance.

Now this is a random access, or as some people prefer, direct access, and every manufacturer has got it. Combine that with associated data processing machines and you have a modern computer center. This is the technology that is making possible the kind of system we're talking about today, the Business Information System.

You'll hear two pieces of jargon applied to systems like this, which is unfortunate in a way, except that like all jargon they're useful at times. "On-line" means that all stations, all equipment in the system are connected to and are under the control of the central processing unit. It's like the telephone system actually — as soon as you pick your receiver up you're connected to the telephone switching system which is ready to go to work for you. You're "on-line." "Real-time" means you get what you want right now, as soon as you ask for it. Just as, in the telephone system again, you get your party when you dial. With a data processing system, real-time is the ability to get information from the source as it occurs, and to produce it in the typewritten or other form you want it as needed, under control of the central processing unit.

Another useful term to remember is "shared time." A random access machine like the drum I showed you can find the information you want and give it to you so fast — in microseconds — that is can also take care of other people's demands on it almost simultaneously, like a master chess player who's so fast he can play against many opponents at one time.

They're all sharing his time, but because of his speed none of them ever has to wait for him.

In a planned system, a service representative will be hooked up "on-line," to a data processor having a central storage file containing all the essential information about each of our customers. This file will be continuously updated by the various departments, and its information will be immediately available to everyone needing it to handle customers' service requests. With such a device, a representative can be of help to any customer, not just those whose records she has at her desk. And you the customer won't have to wait until one of the girls with your records is free to talk to you. Any one of them can help you. All she has to do is key in your telephone number and she immediately gets your account record on the screen in front of her. If this isn't enough, she hits a page flip key and she can see more of your record. She can also get this information by keying in your home address, or your name.

Now obviously the system we have been talking about is not just a management information system used only by people at the top who extract information from it with which to run the business. A lot of information systems you read about today are like that.

We take a different view. We think of this as a business system where a relatively low level clerk is as involved in it as the Chairman of the Board. But certainly the information available from the big central file—transactions that involve money, manpower, material, facilities — also has to be in a form that makes for much better planning, decision-making, and control, the functions that add up to scientific management.

When you apply scientific management to a business, you have to get many things in extreme detail. We do this now — manpower scheduling, sales forecasting, simulation, cost analysis, statistical sampling, application of other "Operations Research" techniques. But data processing systems help you get this information faster so you can make meaningful decisions while the data are still current, instead of having to wait until the critical moment to act has passed.

Now we're at the point where we say, "And now, gentlemen, I'd like to go over implementation of B.I.S. with you." I think of a remark by Charles F. Kettering: "God knows there's no greater endurance contest than the introduction of a new system." An important part of our job at C & P is, of course, to get this Business Information Service into existence, to get it implemented. To do that, we have to be one third intelligence agent (just trying to keep track of what's going on is a gargantuan effort in this field), one third consulting engineers to men in our companies, and one third political persuaders. Actually, this implementation mission is so complex the only way to talk about it is to be brief and rather general.

Basically we have three segments to B.I.S. First there is customer service, which you're pretty familiar with. Second are the whole facilities and supplies area — trunk engineering

operations, supplies and inventory operations and other engineering activities. And third are personnel—employee records and payroll, surveys, statistics, reports.

We have selected the customer service area because it is certainly the most important; it involves the customer directly. If we don't deliver first class service to you, all of our other efforts have little significance.

Concentrating in this area first really gives us a chance to improve our service. Right now it takes us an average of 1.6 days to put in a telephone. While this is considered miraculous by the rest of the world, it is not considered good enough here with the ever rising expectations of the public. Almost fifty per cent of our employees are affected by work in this area. It involves all of our operating departments. The greatest need is here, right now. In the Bell System, most of the electronic data processing activity to date has been in this area; the area is well defined, we have good records to work with. We call this segment "Business Information Service, Customer Requests for Service Phase."

Today, the Michigan, New England, Ohio Bell and New York telephone companies have important pioneering projects under way using real-time random access data processing systems. These pioneering efforts are in the areas of processing new service orders, the assignment of telephone numbers and cable pairs, and directory operations. In addition, the New York, Southwestern and Pennsylvania companies are working with computer manufacturers, exploring ways to convert present operations on medium and large batch type computers directly to random access type computers. And in New Jersey, Bell Laboratories and New Jersey Bell are conducting a specialized trial involving calls to information operators.

All these efforts are laboratory experiments attacking different parts of the overall Business Information System. When these experiments are completed, we expect to bring together the best developments of the various trials into a package that can be transferred to other companies when they are ready to move ahead to a full-fledged B.I.S.

Now I don't want to fool you. There is an awful lot of work in all of this. A good deal of it involves laying down the conceptual framework which will allow all this new technology to be applied. And you have to be extremely flexible when you do this. You always have to keep in mind the old military maxim that says the plans do not survive the battle.

The role of the innovator can be a very tough one. In fact, the whole history of science is a sort of hostility to new ideas. That's understandable. It takes time for things like this — a computerized Business Information System — to mature. It takes time to finance it, and to lay out a program in which tens of thousands of employees have got to know exactly what is expected of them.

Sometimes we tell people, "Look, we're not trying to sell anything. All we're trying to do is treat you like the draft board treats pacifists when they get one in the draft. A pacifist

comes in and he says, "You can't make me fight. I detest fighting. No matter what you do, you will never get me to change my philosophy to fight, so don't draft me." The draft board copes with this very simply: they say, "We will not attempt to make you fight, the most we will do is transport you to the battlefield and let you use your judgment." In a way, that describes a lot of what we do in implementing B.I.S.

We have taken a brief look at some of the application going on in the Bell System today. Have I covered any points that should be significant to the NCMS? I hope so. Let's review some of the facts.

Relatively low cost mass storage computers are available and on the market *now*.

Proven programming techniques in your application area are in use in many industries *now*.

Data security can be obtained either through hardware or software or a combination of both.

Communication links will allow you to use as many computers as necessary to store information, and they can be located many miles apart, if desirable.

I believe that hardware and programming techniques are available now to allow the storage and classification of data. The challenge before NCMS will be the total system design. For instance: How will the original file come into being? How will it be kept up-to-date? Who will have access to it? Under what ground rules? Remember, the computer does not make policy. It operates as directed — by *people*. Thank you.

McCONNELL: Thank you Mr. Buckley for a very informative and entertaining presentation. We have a little time for questions.

LES AYRES, Arms Control and Disarmament Agency: This subject — I am addressing my remarks to Mr. Buckley — this subject of putting lots of sensitive information into one place invariably brings up the problem of what mechanism are you going to try and develop to protect the information in its location from being either disturbed or hurt in some manner. I hesitate to use the word sabotage, but that is exactly what I mean. Like for instance there must be some competitors to the Bell System that would just love to louse up your B.I.S. for you. And this brings to mind the fact that it has been done to Bell System maliciously by the young college electronics boys who a couple of years ago devised a system for beating the direct dial system. Would you comment on that, please?

BUCKLEY: This is a continuous problem within the system. What we do is duplicate our files at the end of each business day so we do have parallel records. Now as you go more and more into on-line wheel type processing, this isn't as easy, but I am sure that we will develop similar methods. In addition to that, many of our on-line jobs are what we call duplex design. They have duplex memory. They have duplex CPU, or central processing unit, so I am confident that we can get around this. As far as getting into the system and disturbing any of our vital information, of course our degree of security wouldn't come close to what you re-

quire but, believe me, we have a fair number of methods. We have programming techniques where you have security levels that will allow you to enter specific parts of memory, and this is really a rather simple device. You have a code name and you have to enter this code name or the number into the CPU before it will allow you to get into a specific segment of memory. It's really a level of security so that the clerk has access to a part of this system, but she doesn't have to the financial data or the salary or the personnel records for instance. You can also do it in the way that Harvey described, where you can only use a certain piece of hardware to enter the machine. You use a key and you have to turn the key on and only this particular piece of hardware can enter that particular segment of memory. So there are many ways available today and they all work. The real challenge — I hope I can make this point strong enough — is not so much in the technical design of the computer. For years this has been our biggest handicap, and often it has been the reason we sat back and said, "Gentlemen, if I could only have faster memory or more memory I could do thus and so." Well, the manufacturers have fooled us, you see. Now they have it and the real problem is system design. Our biggest weakness in the industry today is not being specific enough in what we want. If we can define the problem, I am confident we can program it and make it work. In most industries, and it's probably true in the Government, this is a science that is not exact by any means at all.

DONALD WOODBRIDGE: Mr. Bingham, I understood you to say that your security system presupposes that the entries on-line from the peripheral station would be encrypted?

BINGHAM: I didn't mean to imply that is the general case. Although if we indeed wanted to exchange security information across country to a remote work station we may have to use conventional communication techniques. If you are in the region of the computer, you can provide normal within-installations type connections.

WOODBRIDGE: But for remote station, this would make the station considerably more elaborate than for ordinary access?

BINGHAM: Most certainly it would. If you were going to have to provide communication security I don't know any way to cheat that one.

WOODBRIDGE: I don't either. I might point out also that while we have looked today at the technology and the matter of information access in general, we have one other problem in regard to classification — getting classification guidance. That hasn't been brought up at all. It may well be brought up tomorrow in the work shops on classification standards. How will you have to frame classification guidance? For instance how can you bring uniformity into the system so as to make any retrieval or any inquiry you address to the computer process it in an intelligible fashion. That's a rhetorical question.

FRED DAIGLE: I guess my question is for Mr. Bingham. Is Mr. Garrett's system feasible? The one that he proposed to us. And when are you

going to make an unsolicited proposal to DoD?

BINGHAM: I think Mr. Garrett's system is feasible, if feasibility does not include economics. But of course feasibility does include economics. At what level do you want to break this information down? What is the fine structure? What is the cost of having the information updated quickly enough that it can continue to be meaningful. And I think that he raised the proper *caveat* on making sure that it is current information that is in there so that people will be willing to use it and count on it. The remote access station will, tied into a computer, greatly aid in this type of information entry if, indeed, that information can remain unclassified. And policy should, in general, I suspect, be unclassified.

DAIGLE: We might draw a simile of accuracy in feeling that the system will be responsive to Mr. Buckley because if a telephone billing system isn't very accurate, I am sure he gets lots of comments before the day's bills are through being opened.

A. M. STELLE, JR.: Several years ago, I made a presentation to a symposium similar to this with the AEC, and my premise was that we should publish a telephone book rather than trying to get this into the computer setup. I think we have a telephone man here who is certainly experienced in that. My feeling was — and is — that the random access of the telephone book is very difficult to beat when you have a limited number of people acquiring access, and that the time span of the accuracy of any given bit of information is in the order of several months or even as high as several years. So my feeling was that updating a book of the size of, say, the Los Angeles directory or New York directory, about once every six months would be an adequate situation to really keep classification information available to people that needed it. I also extended my thinking a little bit further in that you could categorize your telephone book so that you could have an alphabetical index as well as a subject index. I was hoping that the subject index could be regarded along the lines more of technical disciplines rather than common phone books. The hope was that the information could be conveyed almost entirely in technical language so that the technical people that would be requiring information would express their requirements in their technical characters. This would be conveyed by the classification management people through their telephone book and they could then in turn write a proper DD 254 or whatever was necessary for the particular scope of work. I think we have an excellent opportunity here to get some sort of a judgment as to which direction should we really go. Should we go the mechanical, routine type of access, or should we go to the electronic, very rapid, high speed access to this kind of information.

GARRETT: The big problem is to identify the data that is classified. We have not done that. I don't think we have done it in our very many system program projects outside of perhaps some areas of the Air Force. Too much emphasis has been placed

on classified hardware and I think we have to get to this idea of classified information. As I see it now, the computer forms the possibility of attacking this problem. However, I really don't know the scope of it myself. These listings of three or four hundred items that I mentioned in my talk are only the beginning. It's hardly a real first main step as I see it. I really don't know the whole scope of the problem, Mr. Stelle. It might be possible to maintain some kind of a dictionary, some kind of a telephone book or notebook that would contain all this information. I seriously doubt it. It might well be, as I suggested, if you're working with hibernation information you might go to an outfit in Cleveland and get all the data that they would know about hibernation. You could go to some center where all of the appropriate scientific data is accumulated and maybe maintain your central records for that discipline at that one spot, and anybody who is working in that particular discipline could get the data. Maybe in that spot they could maintain a telephone book, a dictionary, or something like that type of record rather than going to the computer system.

McCONNELL: It sounds to me that we are being advised that the hardware is all there, but maybe we better do some system analysis to be sure we know how to use it and whether we need to use it or not in specific instances.

HOWARD MAINES: It's more of an observation, but I understand that AEC Headquarters is not doing anything along this line but they are computerizing answers that they have given in different interpretations. I understand that is computerized, where they can go to the computer and get the same answers. What are they Les?

LES REDMAN: I understand that an effort of that nature is indeed in process. The immediate question, of course, is the quality and consistency of the input. Once again it's the system design, not the hardware.

MAINES: Maybe that is the first step along the road to eventually achieving something in that area.

REDMAN: It certainly is. The desirability of being consistent in the classification business is as high as almost anywhere except, perhaps, in the application of explosives to industrial tasks.

MAINES: What type of computer — in our limited ideas of what we can use it for — what type would be most adaptive for something like this?

BUCKLEY: Your generation hardware just about from any manufacturer is capable of doing this type of work. The new 360's or the new RCA Spectra Service, Univac, etc., you can go on and on. They are almost all the same.

MAINES: I suppose we have, in our various centers, many computers and one of the biggest gripes I hear constantly is the cost of these things, and so that is something to keep in mind.

BUCKLEY: The cost of hardware is going down at a fairly fast rate. The processing power of the hardware is at a point now where the cost of processing information is quite cheap.

BINGHAM: As an observation, the cost of entering, holding for a month,

and reproducing a page of information on a suitable display, electronic display, is now less than the cost of a Xerox copy of the same page. This is an indication that the storage costs have gone down significantly. It is also an indication that we can probably think of calling up from the bulk storage of a computer—assuming we don't have exorbitant telephone communication costs—we can call it up cheaper and present it on a display than we can pull it out of a published phone book to obtain the same information, and probably an awful lot of other irrelevant information as well.

BUCKLEY: We are convinced, in the Bell System, we could save literally millions and millions of dollars a year by doing away with the telephone directories because of the new techniques and random access. However we would never be allowed to do it by the public because they need the book to address postcards and Christmas cards.

MacCLAIN: Has anybody here really yet tried to do this for classified information? If so, would they be willing to identify themselves and communicate with us?

REDMAN: I should bring to your attention LRL is using a machine to keep track of its decisions and guidance and so forth. This is a simple machine using light-through holes to identify materials and files.

MacCLAIN: If we wanted to obtain information on this, would we simply write to them?

REDMAN: Yes, Dean Warner, LRL.

JAMES G. MARSH, Sandia Corporation: We use a by-product of the nomenclature system keeping track of classified components, nomenclature, and the like. We would be glad to supply a copy of what we have done, if it will be of any use. I want to emphasize that we are just getting started.

BOBERG: George, I might add that we have a project under the same name but I don't think we are as far along the line as the rest of these people. I'm speaking of Aerospace Corporation. Are there any other questions?

MacCLAIN: This question is for Mr. Bingham. Have you actually reduced to operational test the system you described, and if so, could you tell us a little bit about that?

BINGHAM: The system that I described in large measure is presently part of a number of manufacturers' computer equipment. The facility for multiprocessing, where more than one user is sharing the machine at a time, composes most of the demands of system privacy and system security that I have described in my talk. I did identify a few specific additional features such as the flag bit on the executive program execution. And the feature at present is not in any of the existing systems to my knowledge. But, the reason that the computer manufacturers, in their larger systems, are going to multiprocessing, as a way of achieving most for the dollar, is that there are many system demands for things that are not currently in the most expensive part of the hardware, in the high speed memory. So that this system must wait for access to information from the

bulk storage. They better have something else productive to do at that time or you're paying for down time for expensive hardware. So even the smallest Burroughs line is now going to multiprocessing, recognizing this very feature of more throughput for the dollar. So most of these features are becoming available in the third generation or certainly third and a half generation of computer systems that your companies are now buying and will be buying.

DON THOMPSON, EG&G: I do want to point out that I think there is a particular problem here. And that is that you cannot get a yes or no answer back on whether a particular piece of information is classified. The guides are written in such a way that most of it is an interpretive way to get an answer. The computer is built on a yes or no basis.

McCONNELL: Thank you very much for that comment. I am afraid we will have to conclude. Thank you.

AN AUTOMATED DOCUMENT DECLASSIFICATION SYSTEM

By Robert D. Donovan

The system described in this paper is based upon the following premises:

There is no such thing as a permanent secret of nature.

Any scientific discovery is a link to the future, which, if kept secret, can impede the next step, but does not prevent others from creating their own links.

Security classifications are subject to a Gresham's Law of security wherein true security can be jeopardized by the overclassification of non-essentials.

The information process is an integral part of research and development. R&D cannot be engaged without communication of the results of that effort.

The printed word, particularly in the form of complete documents, will cease to be the principal means of communication in the next decade as new diversified computer input/output devices become available.

The major problem in technical literature today, both classified and unclassified, is developing new switching methods that will permit the transfer (or switch) of informational elements rather than the complete documents themselves.

Paragraph classification is an essential link in this development of new switching methods and a systems approach must be made to the problem now.

The entire security classification decision-making process must be reexamined in light of these new developments.

The true price of secrecy to our technology cannot be measured solely by cost reduction or cost avoidance accounting techniques. Columbia University's Dr. I. I. Rabi, a distinguished Nobel prizewinner in physics, once wrote:

"The secrets of military technology must be as highly protected as any trade secrets, but only as long as they are real secrets. In most cases, this time is measured in years rather than decades. Although most policy makers, amateur or professional, are not deeply interested in or capable of judging the technological situation, secrecy

results in frustration, doubt and timidity about the exercise of any independent judgment. The result has been that a number of less inhibited men of greater or lesser scientific or technical accomplishment, but with a low boiling point, have been gaining the public ear on the basis of prestige acquired through a technical accomplishment, quite limited in scope . . . The fear of being guilty of a judgment based on a partial knowledge of the facts misleads many judicious people into accepting judgments by others whose knowledge is even more partial but which extends into the dread domain of the top-secret."

Therefore, we must necessarily examine all phases of the classification decision-making process to insure that it is making a positive contribution to the national defense. The unknown quantity in the process is who is making the classification decisions and how are they being communicated to the contracting agencies responsible for applying them within the framework of the industrial security program. There are many oft-repeated stories ranging from the hilarious to the near-tragic of errors and their effects on the classification system. Legend still holds that some security classifications are established with all the science and skill of a dart game. Personally, I have always discounted this legend because the mathematical probabilities of an accurate hit are much better in darts than they could ever be in the present system of assigning security classifications.

There have been a number of basic research tools developed by the scientific and technical disciplines over the years that could easily be accepted for use in the classification decision-making process. Examples of some of these techniques are:

Modified Citation Indexes. This has been a useful tool of the legal profession for almost 100 years and could be modified to achieve central direction and control of classification upgrading / downgrading actions. This would essentially provide a national reporting system and provide, for the first time, a uniform approach to declassification not based on artificial time periods as is the case under the automatic time-phased downgrading and declassification system.

Key Word Studies. Considerable research needs to be done in the application of key word retrieval technique as it relates to classification. As P. B. Baxendale of IBM established in 1958, the more often a word appears in a report the more it becomes representative of the report content. The COSATI Subject Category List modified for DoD use by the Defense Documentation Center is a good example of the broad application of this technique.

Exploitation of Topical Sentences. A promising technique also explored by Baxendale that offers a possible shortcut to reviewing reports for classification by paragraph involves exploitation of the way engineering report writing is taught in schools and colleges. For a number of years most report writing students have been taught to express the prime thought in either the first or last sentence of a paragraph. Utilizing this principle Bax-

endale analyzed a selected group of reports and found that 85% of the time the prime thought was expressed in the first sentence. It appeared in the last sentence only 7% of the time.

Text Schematics. One of the most promising of the new techniques is the use of text schematics to permit relatively complex instructions to be translated into computer language. This technique employs the use of schematic logic diagrams to communicate basic instructions or guidance with a minimum of misinterpretation. The original studies of this method were made by L. E. Allen and W. B. Kehl who were investigating an information retrieval language for legal studies. The application of this technique to providing centralized and meaningful security classification guidance by computer is feasible today. It would be possible to program a computer system to permit random access inquiries by user agencies and thereby standardize classification interpretations provided to contractors.

All of the techniques I have discussed so far deal with the identification and retrieval of similar classified information elements that may be scattered through many different reports. The inherent difficulties in finding a solution to this problem were described almost a decade ago in a report by the Department of Defense Analyses which stated:

"Even with the unlikely achievement of a complete system of classification and declassification guidelines covering all known scientific and technical information, there is a considerable problem in the indexing and retrieving of reports. Technical information is scattered throughout many unindexed documents. It is, then, a difficult task to implement declassification of a particular technical area by finding all references to it in classified documents."

A temporary alleviation of the classification problem as it related to World War Two and Korean War documents was obtained in 1961 by the implementation of the automatic, time-phased, downgrading and declassification system, but this was essentially an experiment. As important as that system was in breaking the administrative logjam of outdated and overclassified documents the basic problem of timely as opposed to time-phased (in other words less than 12 years) declassification remains. Obviously, the automatic downgrading provisions of this system were welcomed by industry, but it must be realized that the principal achievement was an administrative one—the changing of an "accountable" document to a "non-accountable" (although still classified) item on a time-phased basis. The net result is that the free flow of unclassified technical information throughout the entire scientific community has not been significantly improved and may, in fact, have been impeded by removing the sense of urgency for a workable solution that existed prior to 1961.

In the 14th Report of the House Committee of Government Operations published in November 1963, the results of the DoD declassification program were assessed as follows:

". . . performance in reducing the amount of classified information still remains to be demonstrated. In short, a good policy foundation for breaking the classification bottleneck has been completed, but the actual results are yet to come."

The tremendous growth rate of our technical and scientific literature in the past five years has all but wiped out the initial gains achieved through the time-phased declassification system. In 1963, the President's Science Advisory Committee noted that 100,000 government reports titles are added to the technical literature annually and 25,000 of these are classified. The total collection in the Defense Documentation Center as of May 31, 1966, is 832,705 and is now growing at the rate of 50,000 titles per annum. The 1 in 4 classification ratio also applies to that collection, which means 12,500 classified titles are added each year of which approximately 4,000 are secret. Only 600 individual regrading notices (non-automatic) are received and processed by DDC each year. As you are aware, DDC makes no attempt to apply the automatic, time-phased downgrading to their collection or reproductions, preferring instead to pass the whole administrative problem on to the hapless customer. The net result is that the DDC classified inventory alone has grown by almost 60,000 in the last five years. If you apply the same 1 to 4 ratio to internally generated technical reports and memorandums within government and industry it is no wonder that we now find our technical personnel in this predicament.

It is imperative that we begin to plan now for the problems that we will face in the next decade. Much work has to be done both at the DoD level and also in industry itself. For example, the implementation of 5210.47 in the industrial security program will require a major and expensive retraining program for technical and clerical personnel. If we limit ourselves only to the letter and not the spirit of the directive we will have lost a major opportunity to exert a positive influence on the future course of classification management.

It is not enough to just put a "C" or an "S" at the beginning of each paragraph or, worse yet, threaten to write our technical reports without any paragraphs at all. What should be done at the very outset of this program is require that the basis for each classified paragraph be clearly established and listed in a "classification index" at the end of each report. In addition, the system of identification of each classification element should be machine-compatible in order to provide for future automation. Therefore, when a classified information element is derived, excerpted, or paraphrased from an existing classified report any downgrading or declassification action will equally apply to that portion of the newly created document as well. A fairly simple system can be established whereby an incoming DD Form 254 can be analyzed, the individual classification items numerically encoded and a detailed security plan prepared in which the encoded classification elements are keyed to the specific items that require classification. The author or editor can then use the detailed se-

curity plan to prepare the "classification index," identifying each classified paragraph incorporated into the published report. The "classification index," which corresponds roughly to a "citation index," can be keypunched for each *original* document. The card deck will include the information element code, classification, the basic control number (machine compatible) and paragraph reference number. When a revised DD 254 or other downgrading instruction is received the elements to be downgraded can be quickly retrieved by tabulating machine, corrected, merged, printed and published as a downgrading notice. A variation of this technique can also be applied to classified documents received from external sources.

Although this would be, necessarily, a one company system (since they establish the code list) it logically follows that it could be applied to all classified subcontracts under its control, thereby insuring both administrative efficiency and timeliness in furnishing classification guidance.

There are also broader applications possible if DoD user agencies were to apply this technique to specific programs. The master security classification guides published by Space Systems Division, for example, appear to be amenable to this kind of application. In any event a system will be in operation that permits rapid identification and retrieval of specific classified information elements rather than complete documents. This system would certainly place us much closer to the goal set for a model classification program some years ago when Air Force Lt. General I. H. Edwards, a former member of the Joint Chiefs of Staff, stated:

"I think the crux of the whole problem is expressed in the phrase in our report, in which we point out the act of classification is simple and expeditious, and declassification is involved and tedious, and that somewhere along the line those two extremes must be brought closer together and make classification more difficult, and declassification simpler and faster."

WORKSHOP SESSIONS

Supervised by Fred J. Daigle

The workshops conducted on July 15 were well attended, by representative cross-sections of the membership. The consensus was that these sessions were definitely worthwhile but that more time should be allotted for future such activities. The summary of one session, on standardization of classification guidance, is not available at this time. The opinions, comments, and recommendations summarized below represent a consensus of the participants but should not be construed as being the official position of NCMS.

POST-CONTRACT CLASSIFICATION SPECIFICATIONS

R. D. Donovan was discussion leader. The problem was stated as:

After completion of a contract or program, little or no downgrading is authorized through the medium of the annual DD 254 issued to industry.

BACKGROUND: During the life of a contract, industry originates, receives, and maintains many classified documents. Many think that upon contract completion it is a simple matter to bundle these up and either return them to the customer or destroy them. This is not the case. Contract closure in many instances progresses over a period as long as three years. During this time, the customer requires the contractor to provide on demand any of the many bits of information necessary to justify contract performance, review technical procedure, etc. After closure, retention of certain classified documents is required to satisfy the needs of post-contract audits and renegotiations.

In addition, the customer has long recognized the value to himself and to the nation of permitting industry to retain certain classified information for use in follow-on contracts or for advancing the state of the art in like or related fields.

It is easy to see how a document originated early in a program could attain the age of seven to nine years without downgrading. Much attention was drawn to this situation by the Wright Commission Report in 1957. No immediate activity resulted from this report, but in 1960 the DD 254 was revised to reflect classification of information rather than things and in 1961 the Automatic Downgrading and Declassification system was instituted. Many factors have contributed to the lack of further activity as regards old documents, one being the current practice by classification authorities of assigning all classified information in a given contract or program to a single automatic downgrade group, predominantly Group 3 (we are not here to consider the right or wrong of this approach, but it is necessary to our problem to know that it is being done). As a result, no automatic downgrading can take place and positive downgrade action must be initiated by the provisions of the annual DD 254 review and the review of the Master Security Guides (if they are made a part of the contract by reference in the DD 254).

Let us consider these annual reviews as they are currently being provided to industry. The current cognizant Contracting Officer, largely a victim of the requirement to comply with the word of the regulation, must in accordance with AFISR 7-103 issue an annual review notice. More often than not, this consists of a letter directing the change of the date in Section 3.a. of the existing DD 254 giving it life for another year.

The circumstances that create this situation are readily understandable. Once the program is completed, the cognizant technical, administrative, classification (if any) personnel and the cognizant security liaison officer are dispersed, leaving the contracting officer with the administrative requirement for the annual classification review of a complex program. This officer does not necessarily have sufficient technical knowledge or even time to perform a thorough and comprehensive classification analysis of the changes in technology or application that have developed during the past year. Let us not forget the usual advances in the state of the art of the potential enemy, revelation of program information through official releases, and the unclassified application of technologies by non-military

users. The contracting officer has no single source to turn to that is documenting these changes. Also, to compound the problem, annual DD 254 reviews are required to be furnished by prime contractors for subcontractors who have classified material attributable to any specific contract; however, authority for retention is not always granted by the same agency or office as the one charged with annual review and distribution.

KEY CONSIDERATIONS: Contracting Officer Representatives may be designated to sign DD 254's or their substitute or equivalent. Classification Management Representatives and Technical Personnel are logical sources for designation as Contracting Officer Representatives. A central information agency at military department level could be considered as a point for issuance of post contract guidance. A Master Security Guide is made applicable to a contract only by inclusion in the DD 254—does it too become obsolete after a year?

RECOMMENDATIONS BY PARTICIPANTS

1. **More meaningful Final DD FORM 254 is needed**

The workshop discussion centered about the large amount of correspondence required to fulfill the retention requirements of the ISM at this time. Several of the participants suggested that a possible solution could be achieved if the User Agency would include the amount and period of retention authorized in the final contract check list.

2. **Retention Authority Should be Transferred to the Cognizant Security Office**

Many of the workshop participants expressed the view that the intent of the ISM classified retention authority requirement could not be properly fulfilled by the user agency, particularly on closed contract situations for the following reasons: It imposes an additional burden on the user agency to provide for annual DD Form 254 reviews, which they can avoid by denying retention. No useful purpose is served by the requirement if user agencies **must** authorize retention (as several government speakers claimed). Only the DCASR security inspector is able to determine the overall ability of a contractor to safeguard classified information and he is also responsible for enforcing paragraph 51 of the ISM. If the administrative determination of retention were handled by the DCASR, then a direct discussion could ensue instead of the three-way DCASR-user agency-contractor situation.

3. **Time-Phased Downgrading Group Markings should be revised and limited.**

Many complained that there is a growing tendency by user agencies to use the more restrictive Group 3 marking without any real justification for doing so. Some of the members suggested that perhaps only two group codes should be used—one for excluded material and the other for everything else. An alternate suggestion was that the use of the Group 2 and 3 markings needs to be more closely controlled by user agencies.

4. **A National Clearing House is needed to review all published classified literature on a realistic basis**

Perhaps the most severe criticism of all was directed at the present system of annually reviewing DD Form 254's under closed contracts. In most cases, little or no changes are made and the classification is perpetuated indefinitely if the material does not fall into Group 4. Even where such action is taken, it is an excessively costly administrative process to notify all recipients, particularly when the report is in DDC distribution channels. A few members went so far as to suggest that the various technical indexing centers would be a logical place to handle the annual review of classified reports. This system would, in effect, competely eliminate user agency-contractor communication on the classification of closed contracts.

PRECONTRACTUAL ANALYSIS OF CLASSIFICATION SPECIFICATIONS

Kenneth E. Wilson was discussion leader. The problem:

Under the present system of contract award, the Classification Requirements are not considered a negotiable item and oftentimes are issued without benefit of full understanding of their impact by the contractor who accepts them as a Contract Specification or by the Customer who imposes them.

BACKGROUND: The current accepted method of issuance of new business contracts (as opposed to follow-ons) is the

competitive bid. A Request for Proposal (RFP) is generally the official kickoff document and usually is accompanied by a DD 254 (and sometimes a Master Security Guide). This 254 is written to cover most of the customer's concept of what he anticipates the end product will be. These 254's or guides cannot be expected to anticipate and provide guidance for the approach each contractor will take in his solution to the problem posed by the RFP. To add to the area of confusion, the Work Statement is for the most part classified by paragraph and is capable of containing conflicting classifications within itself as well as with the DD 254. Analysis of the intended requirements of the guidance originator results in confusion ending in the proposal being classified "by what we think the customer meant."

When the proposals are reviewed and the contract awarded, the DD 254 accompanying the contract often is the same one prepared for the proposal effort, changed only as to date and contract identification. At this point additional classification factors may be added such as special access, etc., all of which could have a bearing on the contract cost and/or schedule.

Too many times authority to proceed is given before a written contract and the first look at the Classification Specification. This could require review of all work done during the "authority to proceed period" resulting in upgrading, possible compromise and the requirement to erase accepted terminologies, program nicknames, etc.

All of these problems require clarification and in the meantime hundreds of people are grinding out information that cannot be suppressed, so arbitrary and usually too high classification is assigned.

It is obvious to us in industry that a positive method of coordination, understanding, and, if you will, negotiation of Classification Requirements is a vital prerequisite to entering into the contractual agreement.

KEY CONSIDERATIONS: Should the RFPDD 254 reflect classification requirements during the RFP period or what will be required during the anticipated contract performance period? Should the customer solicit classification input as part of the RFP package the same as any other specification to the contract? Upon award of contract, should the Classification Requirements be thoroughly discussed or negotiated as any other specification? Should Classification Management be an advisor to the contract negotiation team or should they be a member of the negotiation team? Should proposed classification requirement changes be issued as a contract change notice and cost differences (when they are significant) be computed and negotiated as with other contract changes? Should writing of master guides be attempted prior to customer review and acceptance of RFP inputs? Current experience indicated that rewrite is usually required on contract award.

RECOMMENDATIONS BY THE PARTICIPANTS:

1. It is essential, in any RFP/RFQ of significant value or complexity, that the Government provide a DD-254 or other form of security classification guidance.

2. Procedures must be developed and implemented by any company sincerely interested in the cost reduction potential of classification management to get the guidance to the classification management personnel without delay.

3. If the classification analyst is to function to the benefit of the company, he must be included in the proposal or contract team if there is significant value or complexity involved.

4. At the very least, the responsible government classification management individual should be named in each DD-254. It would be even better should he be the authority for the issuance of such guidance and, hence, be the other end of a direct pipeline from the industrial classification management personnel.

5. The biggest single difficulty in the field at this time is communication. It should be logical and frequent.

PARAGRAPH AND ILLUSTRATION CLASSIFICATION AND MARKING.

Under leadership of Steve B. Dudley, the problem was stated as follows:

The requirement to classify and mark classified documents and reports by paragraph and illustration content is a reality and is currently being required by contracting officers. Current and proposed instruc-

tions on the methods of marking are conflicting and do not provide for all the things normally found within a document.

BACKGROUND: The requirement to classify and mark each paragraph of a classified document based on its content has long been a provision of DoD regulations but has not been enforced in the military or required of industry. Today, several regulations have placed this requirement in effect under certain contractual circumstances. It is recognized that there are two escape clauses in the proposed ISM. This workshop will address itself to the problems of complying with the requirement to mark the paragraphs and illustrations, **not to the avoidance of the requirement.**

We must face the fact that paragraph and illustration classification is a tremendous job. A recent Request For Proposal invoked the provisions of AFSCR 80-20 in preparing the proposal documents. The finished proposal covered some 36 volumes plus appendixes. Present instructions are not adequate. The ISM concerns itself with original artwork and makes no provisions for illustrations in a document. Two directives provide that the classification marking of titles will precede the title; the ISM provides that the marking will follow the title. Other examples could be cited.

KEY CONSIDERATIONS: In evaluating a paragraph or illustration, should you consider it a single item on an unidentified page or in relationship to the subject matter of the document in which it occurs? In addition to document or report titles, we are faced with many volume, chapter, paragraph and subparagraph headings; how best to mark them? How about subparagraphs? How do you treat tables within a text? Do you mark a table of contents or index by each entry (title) or as a table? What about footnotes, forms, and captions of illustrations?

RECOMMENDATIONS BY PARTICIPANTS:

1. An attempt should be made to coordinate and standardize the paragraph and illustration marking requirements as the ISM, MIL STD 874, AFSCR 80-20, etc

2. Paragraph classification should be further defined as "classification of each paragraph of a document as it stands **within the context of the document in which it appears."**

3. A table should be considered another illustration and marked accordingly.

4. Table of contents be considered a table and marked accordingly as opposed to marking each table entry.

5. Illustrations should be separately marked within a document, with the marking a full word classification as opposed to single letter. The location of the marking should be the lower left hand corner if possible. Drawing titles to be marked per the requirement for paragraph or subject titles (both of which could be consistent).

(It is noteworthy that in all instances of paragraph, title, subject, illustration, table, etc., desirability of classifying within the context of the document was constantly reaffirmed.)

ANNUAL REPORTS OF CHAPTERS

Northern California Chapter
Fred J. Daigle, Chairman

Article six, section nine, provides for the submission of an annual chapter operations report by the chapter chairman. This requirement was not complied with in 1965. Therefore, this, the first operations report from the Northern California Chapter, will cover the activities from the pre-chapter organization meeting in 1964 to 1 August 1966, the end of the current chapter year. Copies of all reports, projects, bylaws, etc., that are mentioned in this report are appended to the original report for inclusion in the corporate records of the society.

In December 1964, at the suggestion of the national President, I extended an invitation to the then-14 local NCMS members to attend a get-acquainted meeting. Twelve of the members plus seven interested parties attended. The first order of business was to nominate chairman and secretary candidates. Ballots were mailed to the members, and I was elected the first chapter

chairman with Jim Patterson of Sandia Livermore as secretary-treasurer.

In May 1965, as the first item of NCMS business, the chapter nominated candidates for election to the national Board of Directors. At this same meeting, every member of the chapter was appointed to and accepted responsibility for service on organizing committees which included finance, bylaws, membership, and objectives. A policy of rotating the conduct, planning, and organization of the meetings among the members was adopted and proved to be good experience for those members who would not otherwise necessarily be brought to the fore.

In June 1965 we hosted our first guest speaker, Dr. L. H. Wilson, Assistant General Manager, Lockheed Missile Systems Division.

As a result of committee actions, the following results were accomplished during the year:

Finance: A budget for chapter operations was established for fiscal year 1966. The membership voted to assess themselves a one-time assessment of $5 to establish a Chapter cash fund. At the present time, the Chapter has the following cash position:

Cash on hand in the bank	131.50	
Accounts Receivable	50.00	
Net Assets	181.50	
Accounts Payable (dinner bill)		80.00
Net Worth		101.50

Bylaws: A set of bylaws for the chapter were written, approved by the Chairman of the National Board of Directors, and distributed to the membership.

Objectives: The following objectives were adopted with results as indicated:

Membership: Double the membership of the Chapter; new membership to include all branches of the armed forces. Results: The committee drafted a letter to all prospective industries in the Bay Area, with some 50 letters being mailed. Eight replies were received and follow-up letters sent. All interested persons were invited to attend a meeting as a guest of a member. However, guest night was wiped out by flu bug, and results were negligible. During the year, the chapter lost three members from the original 14, and gained eight. Objective not met.

Chapter Organization: Establish standing committees and write bylaws. Objective accomplished.

Chapter Project for General NCMS Benefit: Complete study effort in two areas. Effort to include research, analysis, and publication. One subject to be selected by Chapter; second to be requested from DoD. The presentations by Mr. Dudley and Mr. Donovan at the end of the Friday workshop are the result of this objective. DoD declined to nominate a candidate subject. Objective accomplished.

Workshop: Develop a half-day workshop to be conducted by the Chapter at the 1966 seminar in Los Angeles. Objective accomplished (degree of success depends on your attendance Friday and your evaluation of the effort).

Social Affair: Schedule a Spring social affair. Cancelled; objective not met.

Chapter Seminar: Develop the November meeting into a half-day seminar for chapter participation. This objective was given a good chance to develop when the Chapter received a request from the Research Security Administrators to conduct a program on Classification Management for them. We accepted the challenge and as a result, put on four hours of programming. This included papers on:

"Historical Development of Classification," John Wise, NORCAL Chapter; **"NCMS Contribution, Society Purpose and Objectives,"** Lorry McConnell, Los Angeles Chapter; **"NORCAL Chapter Status and Activities,"** Fred Daigle; **"Establishing Company Classification Management Program,"** Steve Dudley, NORCAL Chapter; **"Improved Inventory Management,"** John Lulis, Lockheed Missiles & Space Co.; **"Effective Document Disposition on Contract Completion,"** Ross Webb, Stanford Research Institute; "Realistic Classification Guidance," Jim Trosino, NORCAL Chapter; **"Demonstration of Visual Aid Employee Indoctrination Program,"** Fred Daigle; **"Future Role of Classifica-**

tion Management," Bob Rushing, NORCAL Chapter.

All these presentations included visual aids. Correspondence and requests for copies of material presented indicate that the seminar was successful. Objective accomplished.

Chapter Projects for National Members: Develop the "NCMS Story" in short form suitable for printing on pocket size cards and for distribution to all members. This was done, printing paid for by the Society and you have these in your possession as part of your Seminar package. Objective accomplished.

Develop the NCMS Story into a 15-minute presentation for showing where requested; established a speaker bureau of members to present the NCMS story on request. Deferred to 1966. Objective not met.

For meetings when no speaker is scheduled, pre-select a discussion subject. For two meetings this was done and three chapter members designated to present a maximum of five-minute discussion on the selected subject; general discussion followed controlled by the chair. Extremely successful. Objective accomplished.

We ended up with a total of six of nine objectives completed, and one partially completed. All in all, I think we had a good record for the first year of operation. In addition, the Chapter assembled, printed and mailed (at Society expense) the April, 1966 Membership list which you received with your 1966 Board of Directors ballots.

In January, the Chapter voted to establish the Chapter year as 1 August to 31 July, to coincide with the annual seminar and to allow the outgoing Chairman to present his report. The tour of duty for the incumbent officers was extended accordingly. At the May 1966 meeting, nominations were made for the 1966 officers, and in June, ballots were mailed.

Washington, D. C., Chapter,
M. D. Aitken, Vice Chairman

The Chapter engaged in a number of correspondence projects during the year, the most significant of which were:

Approximately 300 letters were sent to contractors in the New York, Baltimore, Boston, and Washington, D.C., areas in an effort to stimulate interest in NCMS.

A series of special letters was sent to individuals in various federal agencies including Army, Federal Aviation Agency, and Air Force, as a part of the membership drive.

Letters and promotional material were sent to Dan Manning in Philadelphia, as the first step toward an attempt to organize a NCMS chapter in the Philadelphia area.

Numerous inquiries were answered and quantities of promotional material were sent to various organizations in the Midwest and South with encouragement for establishment of local chapters.

Approximately 100 copies of the summary of the NCMS national seminar were reproduced and distributed. (These summaries had been prepared by Hal Davis of the Boston Chapter of ASIS.)

Another summary of the NCMS 1965 national seminar was prepared by Gene Suto of the Washington Chapter and submitted to the National Chairman.

New officers for the Chapter assumed their positions for calendar year 1966 in January. These officers are: Leo Carl, OSD, Chairman; M. D. Aitken, US Army Materiel Command, Vice-Chairman; Gene Suto, Research Analysis Corporation, Secretary-Treasurer.

Six Chapter meetings were held during FY 66, the highlights of which were:

In October the Navy Department hosted the meeting at the Naval Gun Factory in Washington at which a critique of the national seminar was conducted. A panel of Washington Chapter members discussed various phases of the seminar and of classification management in general. Twenty-three were present.

The Army hosted the November meeting at Arlington Hall. A presentation was made by a representative of the Army Missile Command, covering a report on an Army in-house study of classified document control by automation. Twenty-six were present.

In January the Office of the Secretary of Defense sponsored the meeting

at Parchey's Restaurant. A panel of classification management experts from the Air Force, Army, Navy, Arms Control, discussed classification management policies and procedures within their respective agencies. Attendance was 38.

The Air Force sponsored a meeting in March at the Lawyers Club at which a paper was read on "The Technological War" by Colonel R. S. Sleeper, Deputy Chief of Staff for Foreign Technology, Air Force Systems Command. Theme was the significance of lead time protection. Attendance was 38.

The Army hosted the May meeting at the Charcoal Hearth Restaurant. Dr. John Ford of CIA presented a talk on "Soviet Cybernetics." Fifty attended.

Our last meeting of this fiscal year was conducted as a joint session with the Washington and Baltimore Chapters of ASIS. Several panels discussed such topics as "Technical Security" and "Industrial Security," and talks were made by George McClain, Director of Classification Management, OSD, and Francis Jahn, of Westinghouse, Baltimore. Attendance was about 150.

In March 1966 the Air Force conducted a Classification Management Symposium at Cocoa Beach, Florida. Mr. Leo Hodges, Air Force Systems Command, a very active Washington Chapter member, spearheaded this successful meeting.

As we indicated previously, the Washington Chapter conducted a spirited membership campaign during the year, particularly among contractors. Membership was increased from 17 in July 1965 to 33 in July 1966, with several more in the "prospect" stage.

Here are the Washington Chapter's plans and goals for FY 1967:

We plan to continue the aggressive drive for new members, particularly among contractors. Additional letters will be prepared and sent to various federal agencies in addition to contractor facilities.

The Washington Chapter will continue the series of professionally challenging meetings and will attempt to obtain speakers from among the leaders in the scientific and security communities.

Our efforts to encourage establishment of new chapters in the major metropolitan areas of the East and South will be stepped up and all expressions of interest in NCMS will be followed up.

The Washington Chapter plans to initiate a newsletter on a bimonthly or quarterly basis covering the following subjects: Articles of current interest, notices of meetings, data from other NCMS chapters, short biographical sketches of NCMS members, financial reports, reports from designated representatives in various agencies on the status of their classification management programs.

Another highlight of the Washington Chapter FY 67 program is the participation in a classification management panel at the ASIS meeting in Philadelphia in September 1966. Several members of the Washington Chapter will participate.

During FY 67, we plan to seek methods by which the activities of the Washington Chapter may receive adequate publicity in news media and in security journals.

Finally, we would like to close this report with a short list of problem areas and questions which are suggested for consideration and discussion at this time during this seminar at the discretion of the National Chairman:

First, there is a problem concerning "organizational membership" versus "individual membership." Numerous individuals, particularly among contractors, have not committed themselves to membership in NCMS due to the non-availability of organizational membership and the inability to transfer membership from one individual to another when the member leaves the company.

The second problem relates to funds for recruiting. It is difficult for the chapter to maintain continued dissemination of the promotional material without adequate funding from the national organization. Fifty or $100 dollars per year would provide the chapter with enough support to maintain this program.

The third point relates to the lack

of an adequate flow of information on NCMS activities between chapters and from the national organization to chapters.

Finally, there is a question concerning the dissemination of the 1965 national seminar report which has not been received by the Washington Chapter. This report and the 1966 National Seminar Report would be of considerable assistance in the stimulation of interest in NCMS activities.

Southern California Chapter,
Richard J. Boberg, Chairman

I purposely did not prepare lengthy remarks this morning. One of the directors asked me last night what I was going to say about our activities during the last year and I told him that most of the last six months was spent in preparing for the seminar. That is not altogether true. We have, and very proudly so, some 40 active members at this time. I think this makes us the largest Chapter in terms of membership. We are, of course, proud to host all of you as the Host Chapter.

Our format is somewhat different from those you have been exposed to by the other two chapters. Certainly not necessarily better; it just happens to be ours. We meet on a bimonthly basis during the working day without lunch or dinner. What we do is ask a member facility to host us in one of their conference rooms and we have a business session, generally with a guest speaker. For instance, during our last meeting in June, we were honored to have Mr. Willard Thompson, who is the Head of the Classification Division, Space Systems Division, Air Force Systems Command, whom I see in our audience today, who spoke to us about recent developments in the special access program. Following that we had heated discussions on that subject as well as proposed changes to the Industrial Security Manual which I am sure you are aware is now published and in your hands. We discussed what the impact will be on the various contractors and government agencies that were represented in our chapter, and how we would approach it. We feel that the most beneficial approach to our members is one of a forum much as this is where an exchange of ideas, approaches to problems, methods of solving problems, are made and given. We have experienced a tremendous, and, I hope continuing support from the government side of our house. We have a number of government, DoD, or military—however you want to define them—members in our Chapter. We had a free exchange of information. We do not publish our proceedings because of the fact that much of this exchange is between ourselves. Our plans for next year include committees for taking on some of the projects that we ourselves are discussing today—downgrading DD-254s—this type of thing. We hope to be able to contribute in a small way to the overall effort to help the classification management effort. We are very proud of the fact that we have in our membership now a former director of the National Classification Management Society, Tony Correia, whose term expired last night and, of course, the gentleman you have already been introduced to, formerly our own Chapter Chairman, last year the Secretary-Treasurer of the national body, and, as of now, the current Vice President of the national body, Lorry McConnell. We would welcome with open arms any of you or any one that you know of who might feel that membership in our society, and more particularly in our Chapter, would be beneficial to him. Again I want to emphasize the informal nature of our meetings. It is an exchange of information we all benefit from. The idea of having our meetings during the working day I think is somewhat unique. We took an informal survey as to whether we should continue with this and membership felt we should. They felt that the benefits they got professionally and the benefits that accrued to their respective employers certainly justified the afternoon that we spent on this every other month.